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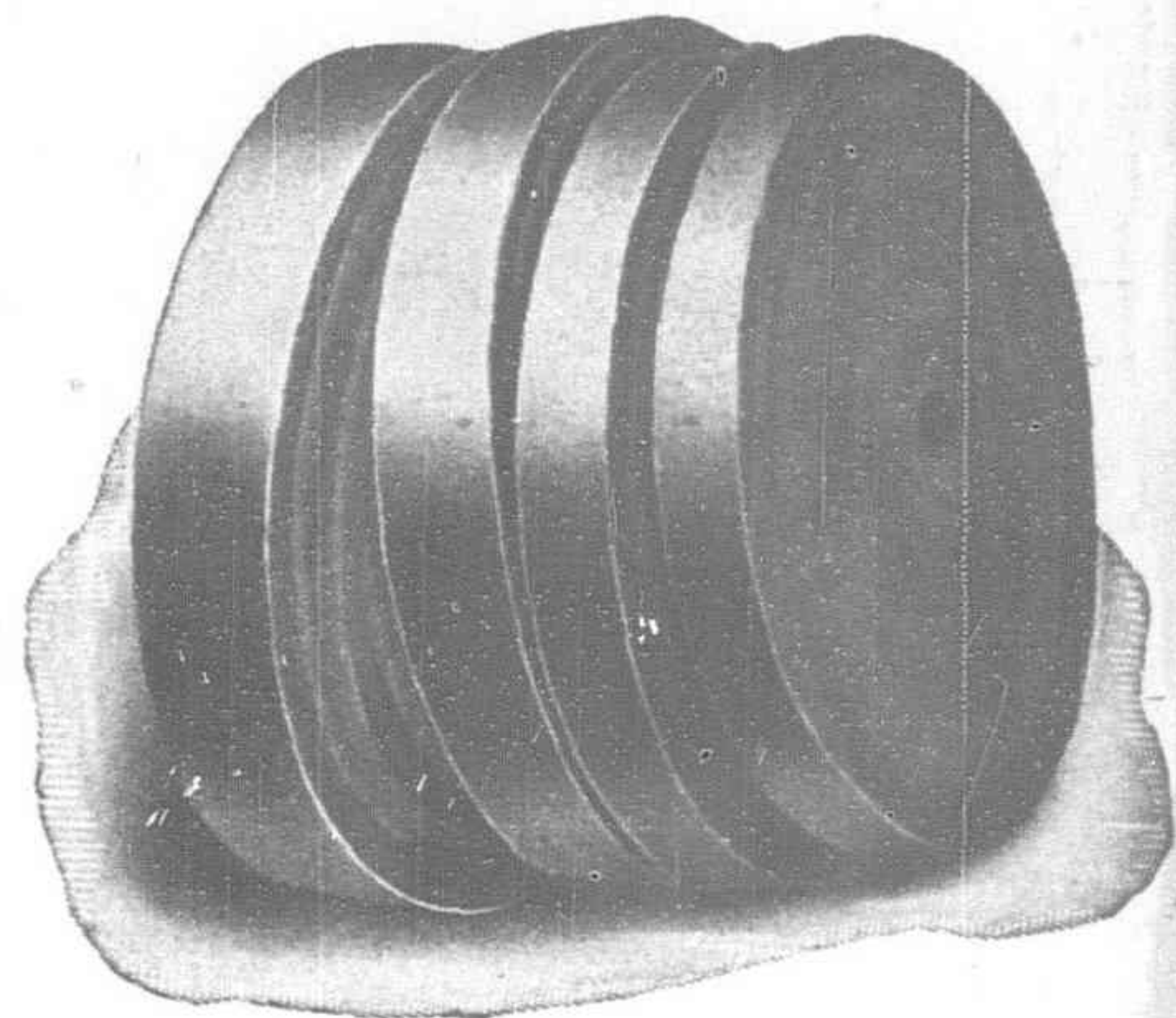
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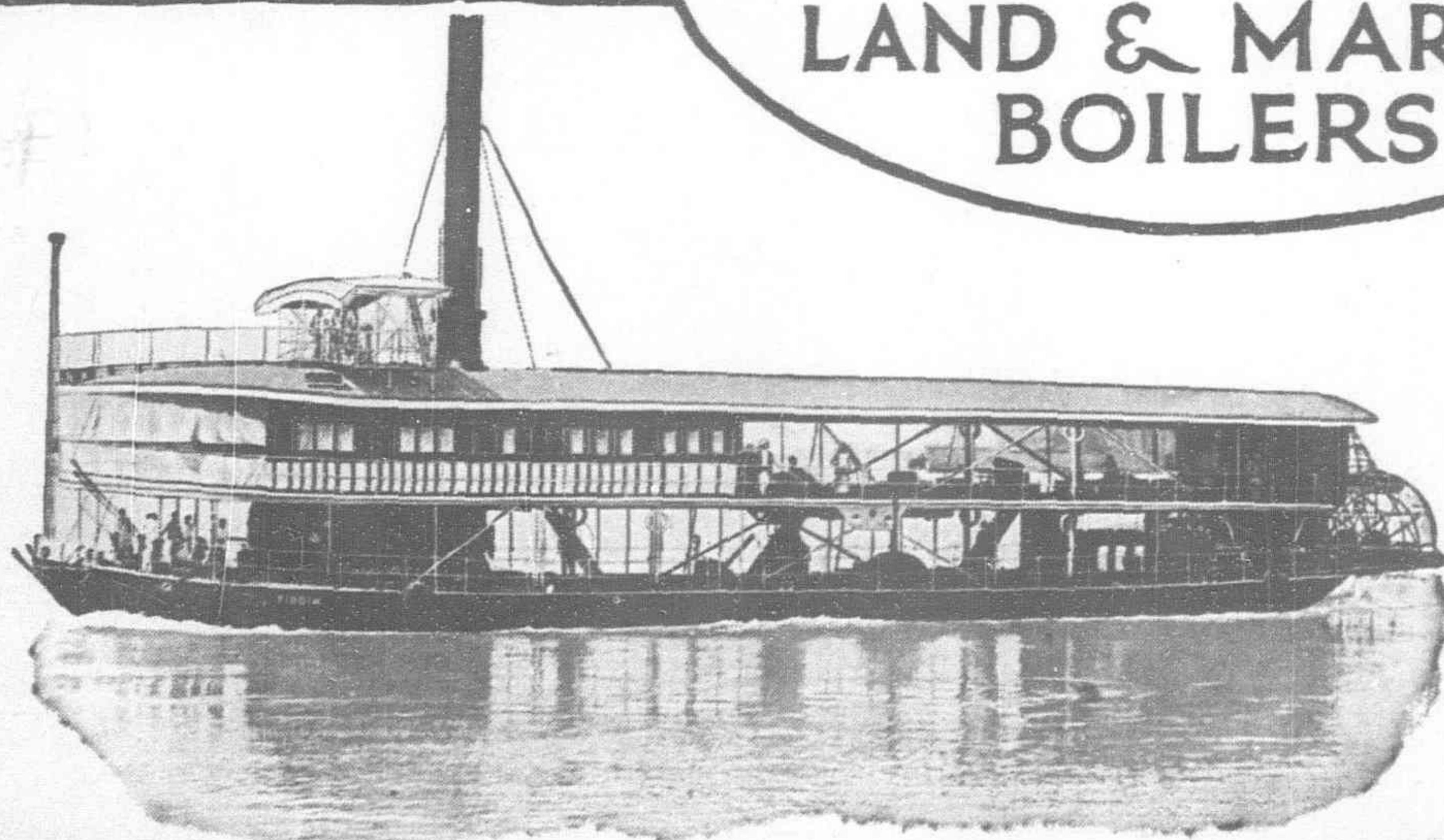
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The Far Eastern Review

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Feigning Ignorance

The Futility of Concealing the Truth

Reflections on Reading a Book entitled "China: Yesterday and To-day," by Edward Thomas Williams, published by the Thomas Y. Crowell Company of New York

By Geo. Bronson Rea

IN a statement recently issued by the national security league, Rear-Admiral William S. Sims, retired, says that thousands of men have been sacrificed needlessly in every one of the wars waged by the United States, including the world war. After reviewing the unbroken record of governmental inefficiency as clearly proven by official documents, he lays the blame on the "hurrah histories" and Fourth of July orations which make no reference to the ghastly sacrifices caused by continued unpreparedness. These histories are written solely to please the public, to glorify incompetent administrations and—to make money. In order to avoid future wars the people of America should be informed of the whole truth surrounding our costly errors, concludes the admiral, and to this we add that it is just as important that the full truth be made known concerning errors of diplomacy which may precipitate future wars with their inevitable sacrifices.

This preamble leads to a review of a new book, entitled "China: Yesterday and To-day" by Professor E. T. Williams and published by The Thomas Y. Crowell Company of New York. Professor Williams is one of the foremost experts on China. In addition to having filled the important posts of American *chargé de affairs* at Peking, chief of the division of Far Eastern affairs in the state department and Far Eastern expert to the American delegation at the Paris Peace Conference, Professor Williams lived for twenty-six years in China, speaks the language fluently, thinks the thoughts of the people and is thoroughly Chinafied in his viewpoints on the problems confronting the country of which he writes. Professor Williams knows his China inside and out, from back to front cover of the ancient books which reveal her long and wonderful history and the various chapters of his own contribution to the store of knowledge concerning the country are replete with invaluable information. In fact, we unqualifiedly place his book in the fore-front of the many volumes which adorn our library shelves, one of the very few deserving of a permanent place as a work of reference on general subjects. The city, the village, social relations, the craftsmen, guilds, religions, ancient history and politics of the country are written in a style interesting and instructive even to old China hands familiar with the customs of the country.

We are reluctant to criticize an author who in addition to holding our highest personal regard has concentrated in one most instructive volume the labors of a lifetime. Professor Williams, the sinologue, is beyond our criticism but Chief Far Eastern Expert Williams of the Wilson administration who very quietly but very effectively moulded and guided our China policy for several years is a different personage.

Expert Williams was present at the Paris and Washington conferences and is familiar with all Far Eastern political documents submitted for the information of the delegates. He knew, or at least should have known, that Sazanoff unofficially filed at Paris on behalf of the old Russian government a copy of the secret alliance entered into between Russia and China in 1896: as an expert he assuredly must have carefully read and stored away in his memory the facts surrounding the signing of this treaty as disclosed in the

"Memoirs of Count Witte"; he must have recalled that Witte described how the original Chinese copy of this treaty was found by the Russians in 1900 locked in the private safe of the empress-dowager and how it was subsequently returned by the Russian government to the Chinese authorities; he knew that the Chinese delegation at the request of Secretary Hughes officially filed at the Washington conference a summary of the text of this treaty: yet in his book he studiously ignores the existence of this epoch-making document.

In simulating ignorance of this alliance, Professor Williams is like every other author who adheres to the worn-out theories surrounding the creation of the spheres of influence. Like all other experts gathered together at the Washington conference he was looking out the window when Dr. Koo read the telegraphic summary of this remarkable agreement. Acknowledgement of its importance would have at once clarified the atmosphere and justified Japan in every move she has made in Manchuria since her war with Russia. It would have taken the bottom out of American diplomacy by revealing that at the very time when John Hay was promulgating the "open door" policy with its corollary principle of recognizing the integrity and sovereignty of China, the government of that country had secretly entered into an alliance which handed over its territories to Russia in order that the latter might be in a better position to attack Japan.

The "open door" doctrine was founded on the basic justice of a great principle and its acceptance by the powers carried with it the recognition of the territorial integrity and administrative independence of China within its then recognized boundaries. That doctrine has since become firmly established as a cardinal feature of American foreign policy, yet we do not hesitate to say that had John Hay known of the existence of the secret Li-Lobanoff treaty of alliance he would never have promulgated a principle which on its face could not be carried into practice because of the alienation of territory by the beneficiary of the doctrine for the purpose of prosecuting a war against Japan. He would have been the first to understand that the promulgation at that time of the "open door" and its corollary principle strengthened Russia's power for aggression while seriously impairing Japan's right to defend herself. The application of the doctrine when Russia was openly manœuvring within the territory of her ally to obtain the strategical advantage in the war designed to crush Japan, effectively closed the door to any move on the part of the victim to defend herself. Japan's hands were tied while her enemies were protected in their plans to destroy her. There is no other honest deduction from the facts of history as subsequently revealed to a wondering world. The success of the doctrine which preserved equal opportunities in China for foreign trade was made possible through Japan's sacrifice, and when to this is added, that Russia had firmly determined to annex Manchuria and convert it into a closed preserve and that Japan's victory restored China's full sovereignty over the territory, the statement that the world is indebted to Japan, challenges refutation. Had even an inkling of the existence of such an understanding been suspected by any of John Hay's successors in the state department it is equally safe to assert

that their sense of propriety and justice would never have permitted them to countenance the series of pin pricks against Japan which has characterized American diplomacy in Manchuria since the day when Harriman with his immense political power labored with might and main to deprive Japan of the enjoyment of the modest fruits of victory that fell to her share at Portsmouth. It is inconceivable that American sense of right and justice would have so countenanced the persecution of a valiant nation and blocked her at every step had these facts been known, and it is equally inconceivable that now when the truth has been revealed through China's own confession that Americans reject the evidence and persist in withholding from Japan the justice that is undeniably hers. Had such a trick been perpetrated upon America or any European country there would have been no peace in the world until satisfaction and national honor had been appeased by a suitable indemnity. The "open door" doctrine while it became a cardinal feature of American diplomacy was never endorsed by China, and the existence of this secret treaty (known to every official of the old Tsung Li-Yamên) explains the reason why. From the viewpoint of the old Manchu officials the Hay doctrine was an intolerable intervention in the sovereign affairs of China, and so well did they preserve their secret that Russia fought her war with Japan and China escaped the penalty attached to her participation in bringing it about.

Lest we forget, let us once more glance at the abridged terms of this treaty:

"Article 1.—The high contracting parties engage to support each other reciprocally by all their land and sea forces in case of any aggression directed by Japan against Russian territory in Eastern Asia, China and Korea.

"Article 2.—No treaty of peace with an adverse party can be concluded by either of them without the consent of the other.

"Article 3.—During military operations all Chinese ports shall be open to Russian vessels.

"Article 4.—The Chinese government consents to the construction of a railway across the province of Amur and Kirin in the direction of Vladivostock. The construction and exploitation of this railway shall be accorded to the Russo-Chinese Bank. The contract shall be concluded between the Chinese minister at St. Petersburg and the Russo-Chinese Bank.

"Article 5.—In time of war Russia shall have free use of the railway for the transport and provisioning of her troops. In time of peace Russia shall have the same right for the transit of her troops and provisions.

"Article 6.—The present treaty shall come into force from the day on which the contract stipulated in Article 4 shall have been confirmed. It shall have force for fifteen years."

The treaty was signed in 1896 and was to run for fifteen years, terminating in 1911. There is no record of its denouncement, so it was in full force at the time of the Russo-Japanese war. China was a full though silent partner with Russia during the struggle of 1904-05.

Any discussion of the terms of this treaty at Washington would have reacted upon the dignity of the very conference before which it was read. The secret Sino-Russian pact made the Anglo-Japanese alliance absolutely imperative but this truth was not permitted to raise its head in a conference convened for the special object of making impossible the extension of this alliance for another period of years. The American people were not permitted to learn a truth which would have told them that the diplomacy of their state department for the past twenty-five years had been based on a fiction. The Chinese submitted the document and it passed into the graveyard of forgotten things. Only one observer had the courage to mention the fact and then wrote a book in which that fact was carefully excluded from any of his conclusions. Americans, British and Chinese joined in a conspiracy of silence to

keep the truth from becoming history and inviting attention to their diplomatic shortcomings. The British might easily have defended their whole policy in China since 1898 by citing this alliance as a reason for the pact with Japan and their determination to prevent Russia from carrying out her plan to reach India by way of Chinese territory. The Chinese dared not comment on a treaty which placed them on the defensive and the Japanese were so glad to get through the conference without further disputes that they also remained silent when the truth which justified them before the world was revealed. Everybody present was admiring the scenery along the Potomac when the evidence was presented which made them all look ridiculous.

The experts gathered together in the great conference room heard, but their minds refused to function when it came to a vital piece of evidence which exonerated Japan from the piled up charges of years. No one had the courage to admit his mistakes; no one dared go before the people of America and confess that after twenty-five years of fulsome slobbering over China, that the old Manchu government had duped the whole world. Not one of these distinguished experts and writers had the moral courage to say a word in favor of Japan who all these years has been subjected to a merciless propaganda based on a perversion of history which placed her in the rôle of a bully and aggressor. Aside from the mere acknowledgement of the filing of the text of the secret treaty of alliance between China and Russia recorded in the official report of the Washington conference for the limitation of armaments, and the one reference to it in the book of Putnam Weale, no newspaper, in Europe, America or China has commented upon or drawn deductions from the evidence so presented.

We could excuse the ordinary writer on Far Eastern matters for ignoring the existence of this document but it is difficult to understand why the Far Eastern expert to the American government rejected this evidence which stands as the basis of modern history in this part of the world. This attack of amnesia on the part of the author makes the chapters of his book devoted to international politics absolutely worthless to the student of these complicated problems.

We stress this point not so much to criticize the otherwise highly meritorious work of Professor Williams but to emphasize the statement that until Far Eastern political history is rewritten in the light of the evidence disclosed by the publication of the text of the secret Sino-Russian treaty of alliance of 1896, a great injustice is being done to Japan, an injustice that if not rectified may still lead to unpleasant happenings. A greater injustice is being perpetrated upon the American people by a conspiracy of silence which preserves the fiction that Japan is the one nation with aggressive designs upon China and in consequence America may be called upon some day in the future to fight Japan in defense of the "open door" principle and the integrity of that country.

It was only a few weeks before the earthquake of September last that two American admirals publicly advocated the appropriation of \$150,000,000 for naval bases in the Pacific in order to be prepared against just such an emergency. It is safe to say, however, that even these two highly placed strategists were ignorant of the existence of an alliance which forced Japan into a cruel and disastrous war to maintain her independence and that by reason of the profound secrecy surrounding the treaty, was buncoed out of the legitimate fruits of victory at Portsmouth. Had Japan known of the existence of that treaty in 1905, there would have been no further discussions over the sovereignty of Manchuria or the Kwantung Leased Territory. It is time Americans should face the truth. Justice, however tardy, should be rendered to Japan even though it involves a complete rewriting of history, remodelling of foreign policies and the frank admission of diplomatic errors.

The day may possibly arise when Americans will be called upon to face these facts over the raising of some question concerning Japan's position or rights in Kwantung or Manchuria and a rush will then be made to the libraries to read up the old books on the controversy.

All these books are based on a false hypothesis, utterly worthless and out of date. Unless the American people are made acquainted with the real origins of the dispute we may once more witness the spectacle of a sentimental people being imposed upon by the propaganda of "experts," who, as President Wilson said of Mr. Hughes, the premier of Australia, "can't hear and won't read." Or, as the Spaniard would say, "no se dan por entendidos."

2. What Is China?

In the Light of China's Own Confession, is Japan Entitled to Reparations?

IN the opening chapter of his book, Professor Williams propounds the conundrum which staggered even the galaxy of experts gathered together at the Washington conference—What is China? Any attempt to answer the question would have provoked a controversy, says Professor Williams, and we may add that any attempt to force a decision as to what actually constitutes China would precipitate a crisis and the convoking of another conference to settle the argument without recourse to arms. With all his accumulated store of expert and inside knowledge derived from years of access to diplomatic records, Professor Williams like a wise man, side steps the answer. He says:

"The nine-power treaty, signed at that Conference, in its first article stipulates that the powers other than China shall respect the sovereignty, the independence and the territorial and administrative integrity of China. But what does that mean?"

Territorial Boundaries

"Does it, for instance, require the eight powers concerned to respect China's claim to sovereignty in Tibet? Does it mean that these powers recognize Tibet as an integral part of China? The question is important, for, although Tibet has belonged to China for many centuries, during recent years both Russia and Great Britain have manoeuvred for position to control the future of this forbidding land, which a British writer describes as 'rich in gold. . . enormously rich, possibly richer than any other country in the world.'

Tibet

"In 1912 the British government objected to the provision of the Chinese constitution which gives Tibet representatives in the parliament at Peking. Objection was made also by the power to China's proposal to send a small military force to Lhasa to protect the Chinese president there. Warning was given that, should troops be sent as proposed, Great Britain would withhold from the new republic of China the recognition which it was then asking.

"In 1913, at the request of Great Britain, a conference was held at Simla to consider the relations of the three countries—Great Britain, China and Tibet.

"The British delegation drew up a treaty which proposed to divide Tibet into two parts—outer Tibet, adjoining India, and inner Tibet, bordering on China. The former was to be autonomous under a shadowy suzerainty of China, and it was further provided that in case of difficulties arising between autonomous Tibet and China, the questions at issue should be referred to Great Britain for equitable adjustment. This proposed treaty would thus have put Great Britain in the position of protector of Tibet. It is interesting to recall that it was by similar arrangements that the British government came gradually into control of Northern India. Sikkim, Nepal and Bhutan, once tributaries of China, are now under British control. In 1912, however, China refused to sign the proposed treaty; Tibet was willing to accept it. The question therefore remains unsettled: Is China sovereign in Tibet?"

Outer Mongolia

"In 1911 Russia encouraged outer Mongolia to declare its independence of China, although it had been a part of the empire since A.D. 1691. Under this encouragement advantage was taken of the revolution in progress in China to establish an independent Mongol government under the rulership of the Hutukhtu of Urga, who was elected emperor and crowned in December, 1911.

"Subsequently by a tripartite convention signed in 1915, the suzerainty of China and the autonomy of outer Mongolia were acknowledged, and Russia was given a voice in the settlement of questions affecting the foreign relations of the country.

"After the disappearance of the tsarist régime in Russia, China reasserted her authority and compelled the Hutukhtu, in 1919, to rescind his declaration of autonomy. He yielded only under pressure of the military occupation of his capital. When Urga was attacked and captured in February 1921 by a Russian force commanded by Ungern von Sterberg, a reactionary leader, the Mongols gave him support. Japan, which was believed to be anxious to see a conservative buffer state between Korea and Siberia, was also popularly credited with giving assistance to Ungern, and was reported to have offered a loan to the Hutukhtu, if a non-communistic government should be maintained by him.

"After a few weeks, however, Ungern was overthrown by the army of the Far Eastern republic, and Urga was turned over to the troops of the Russian federated soviet republic, which set up there the peoples' revolutionary government. This government still holds the place.

"What then is the status of outer Mongolia? What is its relation to China? Does the nine-power treaty bind the signatories to respect China's sovereignty and administrative integrity in outer Mongolia?"

Manchuria

"When the war between Russia and Japan came to an end in 1905, the treaty of Portsmouth stipulated that both powers were to evacuate Manchuria completely and simultaneously, except the leased territory of Liaotung. The two powers were also to restore entirely and completely to the exclusive administration of China all portions of Manchuria then in occupation or control of Japanese or Russian troops, except the leased territory just mentioned. The two powers also engaged to exploit their respective railways in Manchuria exclusively for commercial and industrial purposes. Again in the treaty of July 30, 1907, these same governments recognized the independence and territorial integrity of the empire of China and the principle of equal opportunity there for the commerce and industry of all nations.

"Yet in the secret treaties of 1907, 1910 and 1912 they delimited their respective spheres of special interest in Manchuria and Mongolia, and each agreed not to interfere in the consolidation and future development of the special interests of the other in the spheres mentioned.

"Furthermore in 1915, by the treaties of May 25, Japan after landing troops and issuing an ultimatum, obtained special privileges in south Manchuria and eastern inner Mongolia.

"At the recent Washington conference Japan withdrew certain of the twenty-one demands of 1915 which had been reserved for further consideration, and agreed that the option which had been obtained on loans for railway building in eastern inner Mongolia and south Manchuria, and on other loans secured upon taxes in the regions mentioned should be 'thrown open to the joint activity of the international consortium recently organized.' She also surrendered the preference obtained in the appointment of advisers to the Chinese government in south Manchuria. But Japan refused to rescind the whole of the twenty-one demands as requested by China, Baron Shidehara said:

"If it should once be recognized that rights solemnly granted by treaty may be revoked at any time on the ground that they were conceded against the spontaneous will of the grantor, an exceedingly dangerous precedent will be established, with far-reaching consequences upon the stability of the existing international relations in Asia, in Europe and everywhere.

"To this Mr. Wang Chang-hui replied that—

"A still more dangerous precedent will be established, with consequences upon the stability of international relations which cannot be estimated, if without rebuke or protest from the powers, one nation can obtain from a friendly, but in a military sense weaker neighbor, and under circumstances such as attended the negotiations and signing of the treaties of 1915, valuable concessions which were not in satisfaction of pending controversies, and for which no *quid pro quo* was offered.

"It was through the twenty-one demands of 1915 that Japan compelled China against her will to cancel her right to redeem the south Manchuria Railway in 1939, as provided in the original contract. It was by means of the treaties of May 25, 1915, extorted from China in connection with the twenty-one demands, that Japan was enabled to extend her lease of the Liaotung peninsula from 25 years to 99 years. The twenty-five-year period would have terminated in 1923. By means of these same treaties the leases of the South Manchurian and Mukden-Antung Railways were also extended to 99-year periods.

"In view of all these facts what is to be said of the status of Manchuria? With large bodies of Japanese troops stationed in various parts of Manchuria, and with Japanese police forces in the Chientao district and elsewhere, to what extent does the nine-power treaty guarantee Chinese administrative integrity in Manchuria?"

"The future will answer the question raised. For the present we can accept no other boundaries for China than those existing under the Manchu Government at the time of its overthrow in 1912, and we must continue to regard Tibet, Mongolia, and Manchuria, therefore, as wholly within the territory of the Chinese republic."

The future, says Professor Williams, will answer the question, by which we infer that when the time arrives the Chinese themselves will compel acceptance to their meaning of what constitutes China. It is a remarkable coincidence, however, that whenever this question is raised it is invariably propounded by an American and directed exclusively at Japan's position in Manchuria or the Kwantung leased territory. Never by any mistake is Great Britain's position in Tibet or Russia's rape of Mongolia questioned; never are French activities in Yunnan made the subject of inquiry; the propaganda is concentrated solely upon Japan, the one nation who paid and paid dearly for every advantage she holds in a province watered by the blood of 200,000 heroes who gave their lives that their homeland might remain independent.

We have quoted Professor Williams in full in order to illustrate how skilfully he omitted any reference to the origins of the war between Russia and Japan. He starts at the middle of the story, at the treaty of Portsmouth and bases his conclusions on this and subsequent negotiations. He quotes freely from all other secret

documents; he quotes Baron Shidehara and Dr. Wang Chung-hui's rejoinder, supplementing these with his own remarks, but never once does he refer to the evidence which would have compelled a departure from his thinly veiled anti-Japanese line of argument.

There are no statutes of limitation invalidating international wrong-doing. By her own confession China is exposed to any demands Japan may present in the future for the payment of an indemnity for her part in the war of 1905. Because Japan has not done so does not mean that she has waived her right to reopen the issue at an opportune moment. It does not mean that China will be permitted to escape scot-free for her treachery. A very dangerous precedent would be established if without rebuke or protest from the powers, one nation can secretly conspire with another to wage war upon a neighbor under circumstances such as surrounded the signing of the Li-Lobanoff secret treaty of alliance in 1896 and which precipitated the bloodiest war in history to that date, and escape all censure and the consequences of its double-dealing even when in after years it frankly confesses its responsibility and complicity. To admit that China is not responsible for acts committed twenty-five years ago is to repudiate all laws of equity and judicial procedure. The force of China's confession at Washington simply staggered those who understood its full import and they dared not comment upon it without disclosing that the chancellories of all the powers had based their diplomacy for the past quarter century on a false premise. Before this great crime which reddened the soil of Manchuria with the best blood of Japan and brought the empire to the verge of bankruptcy the paltry treaties extracted by Japan from China under the ultimatum of 1915 pale into insignificance.

Japan extracted from China in 1915 a very small portion of what she would have been entitled to ten years previous had the truth then been known. Not only the Kwantung leased territory but the whole of north and south Manchuria would have passed

under Japanese sovereignty as the legitimate spoils of war had the truth revealed at Washington been even suspected at Portsmouth.

It is essential to iterate and reiterate this truth in order to counteract the growing tendency on the part of Chinese and their American sympathizers to keep alive the agitation over Japan's position in Manchuria. Americans may feign ignorance of the facts in order to ingratiate themselves with the Chinese. China may some day again question the validity of the 1915 treaties, but whenever the question is seriously raised, whether directly by China or indirectly by America, they must be prepared to face China's confession of guilt and Japan's counter demand for an indemnity that will cause the world to gasp. If such a time ever arrives, the demand will be backed by the full weight of Japan's military forces and endorsed by every man in the empire capable of carrying a rifle. Japan went to the Washington conference only after being assured that the question of her rights in Manchuria were not to be made a subject for discussion. Whatever she surrendered, she did voluntarily, without pressure. She will consent to no further impairment of her dearly bought position.

For America to again question the validity of Japan's status in Manchuria or the Kwantung leased territory after the full and frank understandings arrived at during the Washington conference, would lead Japan to suspect that Americans are determined to create a situation which will ultimately undermine her rights in these regions. How far these rights can be impaired or whittled away is merely a question of how far Japan will further recede without a fight. We reject the idea that the present administration would in any way provoke such a controversy yet even as we write this article a subordinate branch of our foreign service has reversed the established policy of the state department in recognizing Japan's sovereign powers in the Kwantung leased territory, and, if upheld, the decision will compel a revision of the treaties and a readjustment of our diplomatic intercourse with Japan.

3. Back to Portsmouth

The U.S. Court for China Prepares the Way for a Revision of the Treaties

THE issue referred to the preceding article is involved in a case in which an American sea captain is charged with having assaulted four members of his crew while under the influence of drink on shore at the port of Dairen, located in the Kwantung leased territory.

The seaman complained to the acting American consul at that port who instructed them to lay their case before the U. S. district attorney at Shanghai. This rather unusual procedure, we are informed, arose from the acting consul's desire to avoid trouble and the delay to the vessel involved in bringing the case before the Japanese police courts. Upon the arrival of the steamship at Shanghai the four seamen placed their complaint before the American consul-general but as the alleged assault took place outside the limits of the Shanghai consular district he very properly disclaimed jurisdiction over the case. The four men then called upon the U. S. district attorney and a warrant was sworn out which cited the captain to appear before the U. S. court for China. The captain's lawyer contended that inasmuch as the alleged assault had occurred in Dairen and under the sovereign power of Japan, the U. S. court for China had no jurisdiction. This objection was overruled. The decision squarely raises the question of Japan's juridical rights in the Kwantung leased territory, and, if upheld, must result in a loss of face for the state department which ever since Japan has been in possession of the territory has recognized her jurisdiction over foreigners residing there, accrediting the consul at the port of Dairen to the Japanese government under the embassy at Tokyo and in all other ways acknowledging Japan's sovereign powers. After a lapse of nineteen years the United States court for China now says that the state department is wrong; that it had no right to surrender the extraterritorial rights conceded by China to American citizens in the original treaty of 1844 without being authorized to do so by an act of congress and proceeds to interpret the treaties in support of this decision.

The Decision

The ruling on the question handed down by the court and given out for publication, says

"The defendant in this cause questions the jurisdiction of the United States court for China to act on the ground that the crime herein charged was committed in the city of Dairen, which is situated in that portion of China known as the Liaotung peninsula and known as the leased territory, claiming it to be under the sovereign power of Japan.

"In determining the questions herein involved, it is deemed necessary to construe the various treaties entered into by the United States with China, as they are the governing law.

"In the year 1844, the United States entered into a treaty with China which gave to the former certain extraterritorial rights within the territory of the latter. In article No. 21 of said treaty, the United States was given jurisdiction to try and punish its citizens who were charged with the commission of a crime within the territorial limits of China, and it reads as follows:

"Subjects of China who may be guilty of any criminal acts towards any citizens of the United States, shall be arrested and punished by the Chinese authorities according to the laws of China, and citizens of the United States who may commit any crimes in China shall be subject to be tried and punished only by the consul or other public functionary of the United States. And in further prevention of all controversy and disaffection, justice shall be equally and impartially administered on both sides."

"The same jurisdiction was also embodied in the treaty of 1858 in article No. 11 thereof.

"On March 27, 1898, the Russian government concluded a lease with China regarding the Liaotung peninsula. In article No. 1 of the terms of this lease, and in the last paragraph of said article, it reads as follows:"

"This act of lease, however, in no way violates the sovereign rights of his majesty the emperor of China to the above mentioned territory." The territory described in this lease included the city of Dalny which has since been renamed Dairen.

"In the treaty of peace between Russia and Japan, dated September 5, 1905, Russia transferred the lease she had made with China relative to the Liaotung peninsula to Japan, but subject, however, to the consent of China who ratified it on January 23, 1906, under a separate treaty with Japan.

An Analysis

"In analysing the intentions of the parties to these treaties, it appears that China in the original lease made with Russia reserved to herself her sovereign powers over this territory as it was explicitly so stated in the body of the lease. It further appears that in the treaty of peace between Russia and Japan, these same rights were transferred to the latter subject, however, to the acquiescence of China which appears to have been given a few months later. The period of this lease as acquired by Japan extended only until March 27, 1923. In the beginning of the year 1915, Japan sought to renew the Liaotung lease with China, and exchanged notes respecting same under the title of The Treaty Respecting South Manchuria and Eastern Inner Mongolia. This treaty among other things extended the term of the lease of Port Arthur and Dalny for a period of ninety-nine years. It also contained an article which can be said bears strongly on the question that is being considered here.

This article known as article No. 5 of said treaty in the second paragraph thereof, reads as follows:

'Civil and criminal cases in which the defendants are Japanese, shall be tried and adjudicated by the Japanese consul; those in which the defendants are Chinese, shall be tried and adjudicated by Chinese authorities. In either case, an officer may be deputed to the court to attend the proceedings; but amongst civil cases between Chinese and Japanese relating to land, shall be tried and adjudicated by delegates of both nations conjointly in accordance with Chinese laws and local usage.'

"In construing this particular part of the treaty, it shows conclusively that Japan recognized the sovereignty of China, and reiterated in specific terms her extraterritorial rights for her subjects and does not claim supreme powers to herself to the exclusion of Chinese sovereignty in this particular territory.

"During the negotiations between Japan and China respecting this treaty, the famous twenty-one demands presented to China by Japan came into existence, one of which, bore directly on the extension of the lease of Port Arthur and Dalny. On May 8, 1915, an ultimatum was handed to China by Japan requiring her to agree to these demands which the former claims was accepted under duress. However, before China's formal acceptance was given, the United States government communicated the reservation of rights of the American government under date of May 13, 1915, as follows:

'In view of the circumstances of the negotiations which have taken place, and which are now pending between the government of China and the government of Japan, and of the agreements which have been reached as a result thereof, the government of the United States has the honor to notify the government of the Chinese republic that it cannot recognize any agreement or undertaking which has been entered into or may be entered into between the governments of China and Japan impairing the treaty rights of the United States and its citizens in China; the political or territorial integrity of the republic of China or the international policy relative to China, commonly known as the 'open door' policy.'

"It is here very apparent that the United States has not been a party to or has in any way waived her extraterritorial rights given to her by the various treaties with China, and took the occasion to so notify both China and Japan before this treaty was actually signed.

At Washington

"The same question subsequently occupied a very important part in the sixth plenary session of the conference on the limitation of armaments held in Washington on February 4, 1922 (page 324).

"The chairman, the Honorable Charles Evans Hughes, secretary of state of the United States, read into the record of that session the following statements which were declared to be a part of the record, and agreed to by the representative of the powers present. It reads in part as follows:

'By the chairman:

'I am directed by the committee on Pacific and Far Eastern questions to read for the purpose of having the statements formally placed upon the records of the conference, the following declarations with respect to the so-called twenty-one demands of the Sino-Japanese treaties of 1915.

'The first statement that I shall read is the statement made to the committee by Baron Shidehara on behalf of the Japanese government.

'(2) Japan has no intention of insisting on her preferential rights in the Sino-Japanese arrangement in question concerning the engagement in China of Japanese advisors or instructors on political, financial, military or police matters in South Manchuria.'

'And in article No. 3 of the last text is found:

'In coming to this decision which I have had the honor to announce, Japan has been guided by a spirit of fairness and moderation, having always in view China's sovereign rights and the principle of equal opportunity.'

"The chairman, then on behalf of the government of the United States, read in part as follows:

'With respect to this grant, the government of the United States will, of course, regard it as not intended to be exclusive, and, as in the past, will claim from the Chinese government for American citizens, the benefits accruing to them by virtue of the most favored nation clause in the treaties between the United States and China.'

"In these utterances which have been made a permanent record, and adopted by the United States government, it shows conclusively that it never has relinquished its extraterritorial rights in this particular territory in question.

"It further appears that Mr. Hay, secretary of state in 1900, instructed the consuls in China that they had no authority to exercise extraterritorial jurisdiction or to perform non-judicial consular acts within the leased territory under their present Chinese exequators, and that his instructions were complied with: that the reason for so acting was due to the fact that the other powers with the exception of Japan were under the opinion at that time that the leasing of Weihaiwei, Shantung and the Liaotung peninsula transferred the sovereignty to the lessees.

"In the memorandum of Mr. Van Dyne assistant solicitor for the United States (For Rel. 1900, 387, 388, 389, Moore's International Law Digest) he seems to take a different view of this situation that did Mr. Hay, and says:

'As it is expressly stipulated in the lease that China retains sovereignty over the territory leased, it could doubtless be asserted that such territory is still Chinese territory and that the provisions of our treaties with China granting consular jurisdiction are still applicable therein. But in view of the express relinquishment of jurisdiction by China, I infer that the territory is permanently(?) is merely intended to cut off possible future claims of the lessees that the sovereignty of the territory is permanently vested in them. The intention and effects of these leases appear to me to have been the relinquishment by China, during the term of the leases, and the conferring upon the foreign power in each case of all jurisdiction over the territory. Such relinquishment would seem, also, to involve the loss by the United States of its right to exercise consular jurisdiction in the territories leased. And, as Mr. Conger suggests, as these territories have practically passed from the control of an uncivilized people to civilized, there would seem to be no substantial reason for continuing to exercise such jurisdiction.'

"Furthermore, the United States was given certain rights within the integral territory of China by a treaty, and these rights can be abrogated in no other way than that in which they were given. In other words, before the United States relinquished extraterritoriality in any portion of China as existed in 1844, there must be definite action taken by congress.

"Judge Moore in his International Law Digest (Vol. 5, page 321) says:

'That the contracting power can annul the treaty cannot, I presume, be questioned, the same authority precisely, being exercised in annulling as in making a treaty.'

"He further enunciates a principle (Vol. 5, page 337) which strongly bears on this case, and which reads as follows:

'An alliance between two nations cannot absolve either of them from the obligations of previous treaties with third powers.'

"And again (Vol. 5, page 369):

'It is the duty of the courts not to construe an act of congress as modifying and annulling a treaty made with another nation, unless its words clearly and strongly point to such a construction.'

Citing in support of this, principally, the cases of *Lem Moon Sing vs. U. S.* 158 U. S. 538, and *U. S. vs. Mrs. Gue Lin*, 176 U. S. 459.

"This last principle of Judge Moore's seems to cover the situation herein involved. The defendant in this case is the one that is attacking the jurisdiction of the United States in exercising its authority over him in an action brought in its federal court. There is no positive assertion on the part of the United States that it has abrogated its treaties with China in respect to the issue involved in this case.

"It might be said that this situation would become more complex should this same objection be made by a friendly power, as the disposition of the matter would then be adjudicated by a totally different tribunal.

"Having taken into consideration the various phases of this novel case, I fail to find that the United States Court for China has lost its jurisdiction over this defendant who is charged with committing a crime within the leased territory of China, and more particularly described as being in the city of Dairen. The defendant's demurrer is therefore, accordingly overruled, and as there appears to be sufficient evidence adduced to make out a *prima facie* case of assault against him, he is required to answer the information filed herein."

Commissioner Lurton has rendered a most interesting decision based on his interpretation of the treaties, and as it is a purely legal one will have to be passed upon by a higher judicial authority before it can be lightly set aside. However, strong it may be from a legal viewpoint, it seems to us altogether unnecessary. As he points out, the American government at the time of the twenty-one demands sent an identic note to the governments of China and Japan in which it reserved the rights of American citizens under the prevailing treaties in any new agreement which might be entered into as a result of the negotiations then in progress. That was a very definite statement and seemed to compromise our government to take equally definite steps in upholding it. On the other hand, Baron Shidehara speaking for Japan at the Washington conference, just as firmly announced the position of his government when he informed the delegates that "if rights solemnly granted by treaty may be revoked at any time on the ground that they were conceded against the spontaneous will of the grantor, an exceedingly dangerous precedent will be established, with far-reaching consequences upon the stability of the existing international relations in Asia, in Europe and everywhere."

When, during the same conference Baron Shidehara on the part of Japan waived all preferential rights acquired as a result of these 1915 treaties, it was distinctly understood that this surrender referred particularly to Manchuria. The one and only reason why Japan refused to cancel the treaty itself was because it contained the clause which extended the Kwantung lease to 99 years, the real heart of the twenty-one demands, readily agreed to by China in the early stages of the negotiations without pressure from Japan. Furthermore, the American government was fully informed previous to the convocation of the Washington conference that Japan would attend only on condition that the validity of her acquired rights in Manchuria and Kwantung were not made part of the discussions.

In the heart-to-heart talk between General Leonard Wood and the military leaders of Japan held in Tokyo a few months before the opening of the Washington conference the cards were laid on the table. There was no bluffing. The irreducible minimum of concessions on both sides was frankly and openly declared. Japan's minimum was the preservation of her acquired rights and position in Manchuria and the Kwantung leased territory. This unofficial exchange of views cleared the way for the brilliant success of the diplomats at Washington. Japan entered the conference willing to make every concession for peace compatible with her dignity and vital interests. She drew the line at Kwantung, and cancellation of the 1915 treaty.

The American note quoted in Commissioner Lurton's decision is therefore offset by Baron Shidehara's equally emphatic statement. For nineteen years the state department has acknowledged Japan's sovereign rights in Kwantung and it will do no good to reopen an issue permitted to die a natural death, as a result of a frank exchange of views by both America and Japan. It is well to let sleeping dogs lie.

If the ruling of the U. S. court for China is correct when it says that rights acquired within the integral territory of China by treaty can be abrogated in no other way than that in which they were given (in other words, before the United States relinquishes extraterritoriality in any portion of China as it existed in 1844 there must be definite action taken by congress) we are headed for another merry old squabble over China. By the same logic and ruling the judge of the U. S. court for China retains jurisdiction over Americans residing in the Kowloon leased territory, notwithstanding China's surrender of jurisdiction in the lease. It is safe to say however, that if an American is arrested, tried and punished by a British court for some infraction of the laws committed in the slice of China leased to Great Britain, the question of American jurisdiction will never be raised, nor can we picture the U. S. court for China holding a hearing over an American charged with committing a crime in this region. It now remains for the Japanese authorities to arrest, try and jail the first American offender against their laws in Dairen in order to precipitate another international brawl. If the ruling holds good, the state department must energetically protest against such interference with the rights of Americans conceded by China in 1844. In all fairness it would have to do the same if the British should so far ignore our just rights and exercise juridical powers over Americans residing in the Kowloon leased territory.

It is just possible, however, that a higher court will overrule Commissioner Lurton's interpretation of the treaties in order to avoid another general row over the meaning of what constitutes China and to preserve the dignity of the state department. If congress should now be asked to take action on all

impairments of China's sovereignty and alienation of territory since 1844 what a jolly old international comedy would be staged when the curtain is rung up at Washington by the introduction of the several bills required to fully cover these infringements of American treaty rights.

Let us look at the question from another angle. If the American court retains jurisdiction over its citizens in the Kwantung leased territory, so do all other nations. Now Kwantung is ruled by a Japanese governor-general. It is a military stronghold, the strategic key for the proper defense of Japan against another attack from the north. In this territory, Japan must exercise full juridical rights, or her position from a military viewpoint becomes impossible. In the event of hostilities or military preparations against any contingency, under this ruling Japan would be unable to exercise jurisdiction over spies and enemy agents. On this score alone the ruling prohibits her from exercising powers vital to the maintenance of her position.

Some time long before the expiration of the leases to Kwantung, Kowloon and Kwangchow-wan, foreign extraterritorial rights will be surrendered in China. If the ruling of the U. S. court for China is upheld, all foreigners residing in these leased territories will then automatically come under Chinese jurisdiction, and to carry the decision to its logical end, the establishment of Chinese courts within these territories will follow as a matter of course. Japan will then have no power over foreigners residing in her leasehold who violate her laws or military regulations. What a fine mix-up this will cause.

The decision strengthens our own contention that there are no statute of limitations to international wrong-doing, and when the United States court for China harks back to 1844 to support a decision and asserts that even the state department has been mistaken in its interpretation of the treaties ever since John Hay recognized Japan's sovereign powers in Kwantung, then Japan would be equally justified in harking back to 1896 and demanding a revision of the treaties based on the new evidence disclosed in the confession of China before the international conference at Washington. It's a poor rule that don't work both ways.

Higher authorities may or may not uphold the court, but the decision will stand in the records as the carefully prepared interpretation of the treaties by a legal expert. By appealing to the same line of argument the Japanese government is provided with a precedent justifying it at any time it considers opportune, in asking for a reopening of the whole Manchurian question. The raising of the issue by the U. S. court for China may call for a complete readjustment of Far Eastern political boundaries, and in the light of China's own confession, an end would be brought for all time to the interminable nagging of Japan as to her rights in Manchuria and Kwantung.

Chinese Railway Dreams

NOTWITHSTANDING that up to the organization of the consortium the Chinese government had contracted for the construction of over 12,000 miles of new railways which at prevailing costs will require the floating of loans aggregating over a billion gold dollars, every now and then comes the news of agreements for the building of additional lines. To the above mileage is now added another 2,000 miles for the Canton-Chengtou railway with its branches and the three lines recently contracted for in North China totalling five hundred or more miles and calling for an additional three to four hundred million gold dollars to the billion or more in loans waiting to be floated. There is not enough available money in the world to finance China's legitimate railway contracts, yet still they come, flocking to the Eldorado where fool's gold lures the inexperienced and blinds his eyes to the truth.

The Canton-Chengtou-Yunnan Lines

In April of last year, Dr. Sun Yat-sen, in his capacity as head of the southern confederation of provinces, entered into an agree-

ment with the Northern Construction Company of Vancouver for financing and constructing a railway from Canton to Chengtu in Szechuan with a branch parting from the main system somewhere in Kweichow province and terminating at Yunnanfu. In the event of unification of the government, Dr. Sun compromised on behalf of the southern provinces that the contract would be recognized and taken over by the central authorities. The terms were similar to the agreement signed in 1913 between Dr. Sun and Pauling & Company, Ltd., for the building of the same line and like that contract stands as the most favorable to China yet entered into for railway construction. The contractor agreed to build and equip the line on a basis of five per cent. construction profit or one-third less than Pauling & Company and three-eighths under the Siems-Carey terms. The financial conditions were left open in the preliminary agreement in order to enable the contractor to sound the financial markets in Canada, America and England. He was allowed six months to do this with a further six months in the event satisfactory progress could be shown. Another six months extension was provided for in case conditions warranted it, but it was understood that unless the contractor could raise

the loans on satisfactory terms within twelve months, the agreement would be null and void. The bonds on the first two sections of the line traversing Kwangtung and Kwangsi were to be guaranteed by the governments of these two provinces and secured on the provincial revenues pending national unification, when they were to be additionally secured on the general revenues and good faith of the central government of China. On the whole, the contract was conditional on the ability of the contractor to furnish the loans on terms acceptable to Dr. Sun and does not compromise the Chinese people to any surrender of a valuable right. Its one outstanding feature is the extremely low construction profits. These will stand not only as a further proof of Dr. Sun's honesty and ability but as in the case of the Pauling contract of 1913 serve as a guide for future contracts of a similar nature. Owing to the existence of the consortium agreement the contract may never be carried out, but Dr. Sun took a chance with the largest railway constructors of Canada and in so doing created terms which others will have to meet in any open or fair competition for the construction of future railways in this country. Owing to the absence of definite surveys it was obviously impossible to estimate the exact cost of the proposed lines or formulate an approximate idea of the extent of the loans necessary. Each section was to be surveyed, the costs estimated, the loans calculated upon these figures and the details of each installment to be agreed upon before being placed on the market. Viewed as a percentage contract it is above criticism and whatever may be the objections to Dr. Sun in a political sense he once again demonstrated that China can obtain exceptionally favorable terms in open and honorable dealing with foreign constructors.

The line and its branches as proposed by Dr. Sun is most vital for the proper economic development of China, linking together the provinces of Kwangtung, Kwangsi, Kueichow, Yunnan and Szechuan and providing a deep water port within Chinese jurisdiction as an outlet for the trade and products of this vast region. If a deep water port is ever created at Canton, the construction of this railway and the completion of the Canton-Hankow line will draw all the traffic of south and southwestern China to its legitimate outlet. Politically, the Canton-Chengtou-Yunnan line will bind together the liberal provinces of the south and enable them to present a solid front against any future attempt on the part of northern militarists or monarchists to overthrow a constitutional government. It was for this reason that Yuan Shih-kai vetoed the original contract for this line between Dr. Sun and Pauling which he contended would develop Canton into a large commercial centre with huge revenues for the Kuomintang party which would enable the parliamentarians to block his plans to revive the monarchy. For this reason he insisted in the final agreement, that the line be changed to one beginning at Shasi on the Yangtze and terminating in Singyfu in southwestern Kweichow, there to connect with the French Yanchow-Yunnanfu line. The political and economic value of the Canton-Chengtou line and its branches are so great that in any compromise between the warring factions resulting in a unified government, Dr. Sun Yat-sen and the other chiefs of the southern provinces will enforce as one of their conditions the recognition of this contract in order that the south will be given an even break with the north in the allocation of national revenues as security for future railway construction.

The Hollamby Contracts

In contrast to the contract for the Canton-Chengtou line signed by Dr. Sun are the three agreements alleged to have been entered into by certain Chinese "promoters" in North China with the British firm of Hollamby & Company. Although the identity of the Chinese principals to these contracts is somewhat obscure and the Waichiaopu is reported to have repudiated them, full information even to the details of the preliminary agreement have been printed in the Peking and Tientsin newspapers. The railways said to have been contracted for, are (1) the Chefoo-Weihsien line, at an estimated cost of £4,000,000; (2) Tsangchow to Shikiachwang to cost £5,000,000 and (3) a line from Tientsin to Chihfeng in Eastern Inner Mongolia, to cost £10,000,000, a total of £19,000,000.

The Chefoo-Weihsien Project

It is difficult to believe that any sensible business man would enter into a contract for financing and building the above-mentioned lines and pay in advance a stipulated sum equal to five per cent. of

the total loans (in the neighborhood of four and a half million gold dollars) when previous claims are taken into consideration. The projected line from Chefoo to Weihsien has filled more newspaper space than any other one railway proposition in China. Ever since the Germans entered the province of Shantung in 1898 there have been schemes, intrigues and fights between the central and provincial governments on the one hand and between the Chefoo chamber of commerce, the merchants and gentry on the other, over the right to finance and build this railway. It would serve no good purpose to spoil more good newspaper and tire the reader with a resumé of the history of this scheme. The only point that matters is that in the Shantung treaty between Japan and China signed at Washington in February, 1922, Japan surrendered all preferential rights inherited through taking over the rights of Germany in that province, and, further, renounced any claim to have the Chefoo-Weihsien railway included in the consortium pool, *provided the line is to be constructed with Chinese capital*. This would appear to be very clear, so when the Chinese now enter into an agreement with the British firm of Hollamby & Company acting as agents for the Anglo-Chinese Ventures Syndicate, Limited of London, it violates the treaty with Japan signed as one result of the Washington conference. This attempt to keep alive the agitation against Japan would seem to be strengthened by a further study of the facts surrounding the other two projected lines included in the contract.

The Tsangchow-Shikiachwang Line

It may be quite proper to differentiate between a railway crossing the zone between the Peking-Mukden and Tientsin-Pukow lines connecting Tsinanfu and Shuntehfu and a line a little further to the north connecting Tsangchow and Shikiachwang. For all practical purposes they will serve the same region. The construction of one makes the other superfluous. Now the line from Tsinan to Shuntehfu is also one of the concessions inherited by Japan from Germany and subsequently confirmed by the signing of an agreement between Japan and China in September 1918. Japan paid over to the Chinese government the sum of Y.20,000,000 as an advance on the loan for the construction of this and the Kaomi-Hsuchow line. In the Shantung treaty signed at Washington (referred to above) Japan's rights to these two lines were surrendered to the international financial group. China's acceptance of this transfer of rights constitutes on her part an official recognition of the consortium and an obligation to repay the advances on these loans. To destroy the value of the Tsinan-Shuntehfu link, before this obligation is met would seem to be a flagrant breach of the Washington treaties. The purpose of both the Tsinan-Shuntehfu and the Tsangchow-Shikiachwang lines is to link the two north and south trunk railways and while there is a special reason for the latter which provides the Cheng-Tai line with a more direct outlet to Tientsin there can be little doubt that the object of the contract is to raise a political question with Japan or the consortium powers.

The Tientsin-Chihfeng Line

The full extent of the politics surrounding the Hollamby contracts is more clearly seen in the line from Tientsin to Chihfeng in Eastern Inner Mongolia, though here the politics are as much internal as international. The Peking and Tientsin newspapers state that the construction of this line has been strongly urged by General Wu Pei-fu, and if this is the case, it must be accepted as a strategical move, which if carried out, would enable General Wu to outflank General Chang Tso-lin in the final fight between these redoubtable war-lords for supremacy. But aside from this, the line is very clearly intended to destroy the value of the Taonan-Jehol agreement on which Japan paid China Y.20,000,000 as an advance on the loan for its construction. This line was also handed over by Japan to the consortium during the negotiations at Washington, which once more obligates China to recognize the monetary advances and protect the rights of the consortium. The new line will not touch at Jehol (Changtehfu) but pass some distance to the east on its way into Eastern Inner Mongolia and its terminus at Chihfeng. Both the American and British governments very bitterly opposed Japan's right to build the Taonan-Jehol line and rejected her plea that it was necessary for the proper protection of China and Japan against "the menace from the direction of Urga." Japan also had the right to build a branch that would have connected this line somewhere in the Jehol district with the sea, the

intention being to have its outlet near Chinchow. The new line will tap the richest districts tributary to the Taonan-Jehol project. Now it may be that a British company can step in and take over rights that have caused so much international hard feeling and on which large sums have been advanced; but we doubt it. If the British government should fail to disapprove this contract, the Japanese government will undoubtedly protest it and in this would have the support of the American government through whose initiative Japan was influenced to surrender her rights to the Taonan-Jehol line. Japan paid Y.40,000,000 to China as an advance on the loans required to build the Mongolian and the Shantung railways and was compelled through the pressure of the other powers to surrender these rights and pool them with the consortium. She also waived her right and that of the consortium to the Chefoo-Weihsien line, provided that it be built with Chinese capital. Japan has not received one cent. of interest on her advances, and to date China is in default nearly Y.20,000,000 on interest alone. Yet the Chinese gleefully hand over the rights that has cost Japan about Y.60,000,000 in order to obtain an advance

from a British company. And there are many writers who will defend China and call upon heaven to support her in any scheme that will place Japan in the position of opposing the "open door" doctrine.

The names of the interested Chinese are not given. They are simply designated as "the promoters." It is understood that the parties to the Chinese side are officials and gentry of the towns and villages traversed by the line, which, if true, is evidence that the ministry of communications and the Peking cabinet have revived private railway ownership and that a company duly registered and licensed has been organized and represented by the so-called "promoters." In such a case, a loan would have to be a purely private transaction without any guarantees other than the employment of a British chief-engineer, chief-accountant and traffic manager. The Waichiaopu disclaimer of any knowledge of the contracts would strengthen the belief that the full story remains to be told. Northern newspapers have hastened to congratulate the British contractor, but until more definite information is available we are inclined to the belief that condolences are more in order.

The Turning of the Tide

FOR reasons we have never fully understood, it is rare that a British editor or writer has a good word to say for Dr. Sun Yat-sen or his cause and this sentiment is echoed by the so-called exponents of American opinion published in China, controlled directly or indirectly by British interests. It is, therefore, a relief to read in American newspapers words of respect and cheer for the man who, despite his shortcomings, stands head and shoulders above all other Chinese leaders as a champion for honest government. There is increasing evidence, if such evidence be needed, that American love of fair play can be depended upon at a crisis to come to the moral support of the under dog in a fight for the establishment of a government, which, however, far it may be from their conception of democracy, is at least the first crude step towards the attainment of a great ideal in Asia.

Somebody blundered when seven American war-ships were rushed to Canton to join in the demonstration to overawe Sun. It is still a mystery how it all happened. The request for their participation did not come from the American consular or naval authorities in Canton. When the British consul at Canton proposed to blockade the port before the diplomatic corps at Peking had formulated their answer to Dr. Sun's first request for a share of the surplus, the American and Japanese consuls declined to participate without the express authority of their governments. Mr. Jenkins, the American consul-general, even telegraphed to his legation that he did not believe the situation warranted the action proposed by the British and French admirals, but in the event that an economic blockade be established it was suggested that America should participate while reserving freedom of action.

The American legation informed Mr. Jenkins that the diplomatic corps did not approve an economic blockade and the legation itself did not favor landing sailors or marines to prevent the seizure of the customs. Mr. Jenkins was furthermore informed that should Dr. Sun seize the customs the consular body at Canton would receive wide powers for action short of actual warfare. While these exchanges were taking place Admiral Washington, then in Philippine waters, received instructions to concentrate all available ships of the Asiatic fleet at Canton, but further orders intervened which resulted in the dispatch of four torpedo boats and two gunboats to the Canton bund. The mystery as to who influenced the Washington authorities to take such a drastic step without consulting the legation at Peking may never be cleared, but for the present it is a public secret that the demonstration was precipitated by the premature recommendation of the British consul-general without consulting his colleagues in the consular body.

The American people have a very good idea of how they were made to appear as the most aggressive partner in this international show of force for the protection of a security in which they have no direct interest. The *Newark Evening News*, one of the best informed American newspapers on Far Eastern matters, after summarizing the Chinese side of the incident, says:

"If the South China leaders are right about it, then what reply can the powers, particularly America, make? They can say, and they have said, that the Peking government is the only recognized government in China. It is—so far as the foreign powers are concerned. In China it is not so recognized. Peking rule is ignored in more than half of the provinces. It is abjectly helpless outside of Chihli province so far as the enforcing of its orders is concerned. The new President, Tsao Kun, purchased his election by the bribery of members of parliament at an admitted cost of more than \$1,000,000. Even school children, unchecked, parade the streets of the principal cities carrying banners denouncing the 'money-bought president.'"

"It is true that if the powers did not collect the customs revenues and give the surplus to the Peking government under Tsao Kun that government would fall. And the powers hold that then there would be chaos. It could hardly be worse, however, than the confusion worse confounded now existing. Up to date the predictions of the wonders to be wrought in China as a result of the Washington conference have largely failed to materialize.

"Should there be intervention in Canton, perhaps the resultant reaction would be an anti-foreign movement as wide and serious as the Boxer outbreak. That would be unfortunate for the whole world, especially for America, whence came the plan for saving the Far East."

In commenting on the Canton situation, the *Boston Globe* says:

"The situation is not particularly pleasant for Americans to contemplate, as Dr. Sun has earned a fine reputation and there is little reason to think him mistaken about what happens to the surplus revenue sent to Peking. Americans do not relish the use of their flag over the office of a collector of debts which never should have been contracted. The whole business is too messy to be pleasing."

What has America gained by standing solidly with the other powers in support of Chinese militarism? What is the effect upon the Chinese mind as the result of this and the campaign waged for armed intervention in order to strengthen Anglo-American co-operation in these matters? The answer is very simple. America is losing the trust and confidence of thinking Chinese who believe that we are now the worst enemy of their country instead of its most disinterested friend. "With a labor government in England and desire for friendship on the part of Japan, our most dreaded enemy at present is the United States," remarked one of the foremost Chinese business-men of Shanghai the other day.

This opinion will spread rapidly and Americans will pay heavily for the crude handling of a very delicate situation by a small clique who passed vital resolutions affecting the interests of the whole community without reference to its wishes. It is the turning of the tide.

The Boxer Indemnity

SINCE it became known that the American government would return to China the balance of the Boxer indemnity, advocates of various philanthropic schemes for its expenditure have been camping in Washington in order to press the merits of their respective plans on congress. All these proposals are praiseworthy but we hold to the belief that if this further concession is made to China, the greatest good to the greatest number should be the controlling idea in deciding its expenditure. Educating young Chinese in American colleges is a worthy philanthropy, but owing to the absence of opportunities to apply their Western ideas and knowledge, the graduates on returning to China have drifted largely into political jobs where they soon lose their American ideals. Especially is this the case with young engineers whose prospects in their native country are almost hopeless until foreign loans are forthcoming to build railways and establish modern industrial plants. Any scheme that will provide these young American-trained men with an opportunity to exercise their talents on work which benefits the masses of the people should be welcomed if only for the returns in increased trade for our manufacturers.

It is difficult to take sides in the controversy as to the best method of using the balance of the Boxer indemnity fund. If we belonged to the missionary or educational element, we would heartily support any proposal that would divert it to uses that would benefit these special interests. If America was a business nation, the fund might be employed in some manner to settle the Chinese government obligations to American merchants who have been hard hit by China's repudiation or delay in paying her debts. It is almost too much to hope that American altruism will ever soar to the heights of aiding or supporting mere nationals who because of their forced residence in a foreign country for the purposes of trade, have no vote and no country-wide organizations to fight their battles at Washington. Philanthropy in a broad national sense, that is, aiding, comforting, uplifting and educating the foreigner, comes before our obligations to American citizens. This truth will undoubtedly guide our government in deciding how the Boxer indemnity shall be spent.

Mr. Frederick W. Stevens covering this interesting subject in a pamphlet recently issued by the China Society of America advocates the total remission of an indemnity whose punishment portion has long since been paid. We agree in his conclusion that the terms and conditions of a further relinquishment of the American share of the Boxer indemnity should not be determined without a careful investigation of the whole subject. In mentioning, among other worthy schemes, the carrying out of some great engineering project that will rescue some starving portions of China's millions through river conservancy and flood prevention work together with the construction of roads, we believe that he has placed his finger on the one proposal that will bring the greatest good to the greatest number, provide employment for American-educated Chinese engineers and open up a market for American products that will bring increasing profits to our merchants.

While not recommending any special organization for supervising the expenditure of the fund, we invite attention to the program of the international famine relief committee, as presented in the *Journal of the Association of Chinese and American Engineers*, and which to our mind is the most sensible and equitable solution. Naturally, if the United States is to be the only nation to relinquish its share of the Boxer indemnity the expenditure should be entrusted to some purely American organization. We see no good reason, however, why other nations who seem willing to remit their quota of the indemnity should not combine with the United States and agree on some scheme that will bring lasting benefits to all concerned. If Americans determine to expend their share of the indemnity for road construction, most of the motor vehicle business would undoubtedly go to American manufacturers and create intense friction with their European competitors. There ought to be some way to have this great work internationalized through the remission of a certain sum on the part of the larger powers concerned that will bring equal opportunity in catering to the motor vehicle market so created. Any disposition of the indemnity fund for road or railway construction, river conservancy, or other

engineering projects is equivalent to a loan to China for this purpose and gives to any one government making the concession the same preferences in the supply of materials as would obtain under a loan agreement, but without being stipulated. As much as we would like to see the balance of the American Boxer indemnity fund set aside for road construction, that will create a market for American automotive manufacturers, we realize that this gives to them an undue advantage over the manufacturers of other nations, which they would be the first to resent if the shoe was on the other foot. For this reason, we believe that if the American, British, French and Japanese governments could agree on a road building program to be paid for by an equal remission of the Indemnity funds, it would carry out the spirit of the consortium agreement and make for a better understanding. If, at the same time, the surplus customs and salt revenues could also be applied to public improvements pending unification, it would go a long way towards helping China while she is down and out and increase the trade of the country for the benefit of all.

* * *

China's Call to the Engineer

The International Famine Relief Commission and its Program

By O. J. Todd, Member A.C.A.E., Chief Engineer I.F.R.C.

The General Problem

What are China's greatest physical needs to-day? Briefly she is in want of better means of communication and protection from flood and drought. Under the first head she is in need of land transportation facilities including railroads, motor roads, and cart roads. To protect her people from famine due to perennial floods she needs river control works of a nature that will be true insurance to the farmers and town folk living along these great water courses. To deal with the drought problem, which caused the great famine of 1920-1921, irrigation schemes of various kinds must be adopted and arteries of communication established, so that in extreme situations food can be brought in from more fortunate provinces.

It is not necessary to recount the many disasters due to the floods of the Huai river nor repeat the story of the flood of two years ago that laid that whole valley waste, making a huge lake of a farming area larger than the state of Massachusetts, drowning hundreds of people, and causing a flood loss to China estimated at \$200,000,000. The Yellow river has its history of broken dikes, flooding out hundreds of villages in a district, making hundreds of thousands of farming people destitute, and causing the loss of millions in food and buildings destroyed. Other lesser streams have been dealing destruction in thickly settled communities due to the general lack of adequate river control works. The 1917 flood at Tientsin has not been forgotten by the people of North China.

The Present Situation

China's railroads to-day aggregate about 7,000 miles. She needs 100,000 miles as soon as her credit will permit their being financed.

Her only motor roads outside the few large cities on or near the coast are those built during the past three years by famine relief funds. Altogether these total something over 2,000 miles.

Recent military roads that can also be used for automobiles amount to about 500 miles in North China.

Cart roads as a rule are narrow, often sunken, and badly kept up. In the great plain of eastern China many of these roads are made across the fields each year and later plowed over and planted to grain.

Bureaus have been formed to handle specific problems that have to do with harbor improvements, river control, etc. But none of these organizations has gone far in actually carrying out large construction programs though extended field studies have been made by several of them. Some of the worst problems, such as those of the

Yellow and Huai rivers, remain unsolved and without any competent boards for handling the problems they present.

Studies of the irrigation problems of the north where rains are light have never been seriously taken up. Some experimental wells were put down in Western Chihli two years ago as relief measures, but the work ended there.

Some Recent Accomplishments

Due to the political chaos in China the past few years little has been done by either the central government or the provinces in the way of constructing public utilities.

It is true that a short extension of the Peking-Suiyan Railway has been made during the last year and that some double tracking has been done to the Peking-Mukden Railway near the coal region north of Tientsin. But as a part of China's great railroad problem these are insignificant.

Government revenues have also paid for a moderate amount of river dredging and straightening on the Hai Ho near Tientsin. Similarly some river work for the benefit of Foochow harbor has been going on at that point.

While native river bureaus have been partially functioning, the China international famine relief commission has been furnishing funds to the extent of \$1,000,000 during the past two years and under the direction of its provincial committees has actually superintended doing the work of closing dike breaks, repairing old dikes, and building new ones along the Yellow river, Han river, Huai river, and other smaller streams.

During the past three years, through the organizations and with the funds of the American red cross and the China international famine relief commission, standard motor roads have been constructed in several of the northern and central provinces. These alone aggregate over 2,000 miles and are supplemented by various military and other roads built by Chinese officials bringing the total of recently built roads up to nearly 3,000 miles. This is about 1 per cent. of China's needs.

One of the most helpful signs is the offer of General Feng Yushiang to contribute soldier labor from his Peking army at a very low rate to repair river dikes between Peking and Tientsin. General Wu Pei-fu has similarly offered to furnish men from his army to put through a comprehensive plan of river control for the Yellow river in the province of Honan, under the direction of the China international famine relief commission.

The Immediate Program

The immediate program is, of course, to place an adequate system of standard highways throughout China: 5,000 miles of trunk lines and an equal amount of feeders should be built every

year for the next ten years in the northern and central provinces alone. Of course, no such program can be financed now. As famine relief measures, standard highways will be constructed in the badly affected regions every year. Relief will be thus given in the form of wages for labor on these public works.

As famine prevention measures, work will be started on comprehensive programs for permanently controlling the Yellow river and Han river, the provinces most interested raising most of the funds or furnishing the labor.

Work on the Huai river will also be undertaken by a special committee.

The Yellow river training work is to begin northwest of Honanfu and continue down stream. The Han river control work most needed is in the region immediately above Hankow. Studies will also be made of irrigation schemes for using water from the upper Yellow river.

The above program is about to be undertaken by the China international famine relief commission. The accomplishments of the commission will be in direct proportion to the support given it.

Brief History of the Organization

During the great famine of 1920-1921 several relief societies received and disbursed funds in northern and central China. In the fall of 1921, the leaders of these organizations conferred and concluded that there should be one famine relief and prevention organization. While the China international famine relief commission is an outgrowth of a group of voluntary societies formed three years ago for the great famine of North China, it has been made a permanent institution recognized by the consular bodies, the various missions of China, government officials, and the foreign and Chinese public generally. It is a necessity now and may be for many years or until China has a government that can promptly bring relief to distressed sections.

Headquarters for the China international famine relief commission were established in Peking. To perfect the organization, it was necessary to engage a foreign secretary, a Chinese secretary and an accountant. In the spring of 1923, an engineer was appointed to handle all the engineering problems in northern and central China, thereby eliminating waste and securing the highest efficiency for expenditures made by the commission. The practice of allowing local authorities to plan and execute work had proven costly and unsatisfactory, owing to lack of technically trained men. The problem of building up the engineering staff and getting a few young American engineers into the field is a matter of considerable import. It is confidently hoped that support from America will be forthcoming to maintain three or four such engineers to help carry on the very heavy program that has been outlined by the commission's chief engineer.

Cesspool Politics

The Whyfor of the Whereas

WHEREAS, the presidential campaign in America is now in full swing and, *whereas*, the president now in power, if nominated will be re-elected, be it resolved that now is the time for all good mud-slingers, cesspool cleaners and night-soil gatherers to come to the aid of the opposing party and pursuing their odoriferous calling throw their collection of filth at any and all high officials of the present administration who come within range of their strong right arms. This *whereas* explains the whyfor of the recent demands for the resignations of Secretary Denby and throws light on the similar attack designed to discredit Governor-General Wood of the Philippines and defeat any possibility of his appearing before the republican convention as a dark horse in the presidential race. For the moment, every republican official is a potential crook, liar or thief in the eyes of the opposition and evidence is eagerly sought at the bottom of the septic tanks of politics in order to justify a public recital of charges under pretext of calling for an official investiga-

tion. The object is not so much to bring about an actual investigation that will prove the guilt or innocence of the accused official as it is to get the charges before the public in a manner which prohibits a libel suit and allows enough of the filth to cling to the name of the accused to defeat him or his party at the primaries or the polls.

The resolution introduced in congress urging a full investigation into General Wood's administration in the Philippines will stand and stink as one of the most unkind, ungenerous and wholly uncalled for accusations against an American executive that has ever disgraced the pages of our political history. The resolution scores in detail every act and move made by General Wood since assuming his present post and by *inuendo* makes him the most sordid grafter who ever held an office of trust under our government. The first *whereas* of the Frear resolution calls for an investigation into the charges contained in the press dispatches of Mr. Junius B. Wood to the Chicago *Daily News* to the effect that General

Wood had the names of senators, representatives and others prominent in Washington social life who received payment from the Philippine independence fund for espousing the cause of independence, but that these names would not be disclosed until the governor-general concluded the investigation of disbursements made from the million pesos fund voted by the Philippine legislature to bring about secession from the United States. This whereas would therefore appear to be in order, and it is to be hoped that when the time comes the limelight will be thrown on the activities of a bureau with headquarters in Washington through which this "educational" fund was disbursed.

The following whereases include the charges that General Wood has set aside the law: overruled the legal rights of officials as determined by congress under the Jones act and assuming the rôle of dictator both in regard to legislation and of rights and privileges granted to favored individuals and private interests; bringing about conditions that threatened the failure of the Philippine National Bank; endeavoring to turn over the management of the Manila railway to the J. G. White Management Corporation of New York under conditions highly prejudicial to the interests of the Filipino people; to have attempted to force the sale of the Philippine sugar centrals against the protests of the Filipino people and with having maintained an autocratic direction of the Philippine government through officers of the American army who have no legal standing under the law. Furthermore, General Wood is specifically whereased with having drafted without consultation with the Filipino legislature ninety-eight different bills and of having vetoed twenty-one bills passed by that same legislative body; that various charges have been lodged against his autocratic action in interfering in such legislation; that various members of the Filipino council of state and department secretaries had presented their resignations which were accepted by the governor-general; that in consequence General Wood was indicted by the speaker of the Philippine house of representatives for seeking to establish a government in suppression of the popular will and place his authority over and above the majesty of the law and implant a colonial despotism worse than the Spanish régime; that he took the advice of Mr. Wm. T. Nolting, president of a rival bank, in killing the government banking institution; that he sought to denationalize the Philippine economic organizations, accepting his advice on these matters from Americans who desired to exploit the insular resources on a large scale.

The avalanche of whereases turns for a moment to open up the old and forgotten protests and testimony offered against General Wood at the time of his confirmation after his administration in Cuba, presented by Senator Hanna in July 1912 and preserved in the record of that date; all of which is cited to prove his unfitness for his present appointment and to support the resolution passed by practically all of the Filipino politicians asking for his recall. The tirade then swells into a charge that General Wood's selection for the Philippine post would enable him to reciprocate favors extended him in the presidential campaign of 1920 and that his usurpation of power afforded him exceptional opportunities to repay these obligations; that the subscriptions to his campaign fund included contributions from oil, tobacco, banking, railway and other interests that have an interest in the undeveloped resources of the Philippines; that fifteen times more money was contributed towards Wood's campaign expenses than for the successful candidate and that this enormous preliminary campaign expenditure has never been explained either as to the amount of individual contributions or obligations, if any, incurred through its acceptance; that in the campaign to discredit the Filipino demand for independence the press correspondents in Manila were influenced by General Wood in violation of pledges to that effect made by previous presidents of the United States; that Secretary of War Weeks has endeavored to influence General Wood in favor of special interests in Massachusetts; that in depositing \$31,449,219 of Philippine government money in various banks and trust companies throughout the United States, which money was the proceeds of loans placed on the recommendation of Governor Wood and deposited in these banks with the approval of the secretary of war, a profitable fixed deposit is assured these institutions, and is calculated to shape sentiment against Philippine independence through such agencies in their reputed influence with the press, all of which is a strong factor in counteracting the puny efforts of the Filipino people to obtain their independence.

And, whereas, the spectacle of having to support a governor-general out of sympathy with their aspirations is only surpassed by

compelling the Filipino people to help support American financial agencies opposed to their independence; that notwithstanding the controversies over General Wood's acts as governor of Cuba, the present secretary of war is his firm supporter; and whereas the Filipino people practically drove the Spaniards out the islands before the landing of the American forces and were publicly promised their independence and that they are on an equality with the great majority of nations in other parts of the world in education, business, governmental experience, square dealing and stability; and that the Moro trouble is a fake in order to divert attention from the independence movement; that this bogey has been invented by Americans to supersede the worn out menace to the islands from Japan, etc., etc., these alleged facts warrant an immediate investigation of the underlying reasons which cast discredit on solemn pledges heretofore given by our government, and incidentally we may add send one more high-minded American leader down his grave with a broken heart.

Such is the reward of great Americans, the compensation for a lifetime of unremitting labor to advance the prestige of the nation and save the Filipino people from the consequences of the folly of a past administration. Our history abounds with such stories. Scores of great Americans have achieved fame at times of great national danger only to have their honor attacked and their reputations besmirched in the closing days of their life by bitter and unscrupulous political enemies. Representative Frear of Wisconsin has presented Major-General Leonard Wood with the cordon rouge of the American legion of honor. But it is safe to say that the man who followed Geronimo and was in at his capture; the soldier who led the Rough Riders to victory at Las Guasimas and San Juan Hill; the administrator who cleaned up and made Cuba a better place to live in; the general who with the courage of his convictions dared to defy a pacifist president and prepare the nation for the great war and paid for his patriotism by being requested to resign the army for physical disability and was canned for his courage; the private citizen who went before the people of America as their favorite candidate for the republican nomination for president in 1920 and then defeated, accepted the post of governor-general of the Philippines to repeat his arduous work in Cuba; the name of that American will go echoing down the pages of history as one of the nation's greatest leaders, while the identity of the individual from Wisconsin who carried the cargo of Filipino nightsoil from Manila Bay and dumped it in the halls of congress will be drowned in the cesspool of his own making.

* * *

Roosevelt-Matsukata

ON the heels of the announcement of the Mitsubishi-Westinghouse combination comes the news of another important Japanese-American amalgamation of business interests. The new link in friendly relations takes the form of an agreement between the Roosevelt Steamship Company of New York and the Kokusai Steamship Company of Kobe to operate monthly a round-the-world freight service under the name of the Kokusai-Roosevelt line. The details of this agreement were concluded by Mr. Kermit Roosevelt (son of the late president) president of the line which bears his name, on his recent visit to Japan in January. This agreement supersedes one made a year ago between the Kerr Steamship Company, of which Mr. Roosevelt is vice-president, and the Toyo Kisen Kaisha. The negotiations at present under way for the absorption of this latter company by the Nippon Yusen Kaisha made the new deal possible.

The Kokusai Kisen Kaisha is controlled by Mr. Kojiro Matsukata, son of the prince and elder statesman of that name, and head of the Kawasaki Dockyard and other important Japanese enterprises, Mr. Matsukata is one of the most enterprising of Japan's captains of industry, a firm friend of America and advocate of better relations and business co-operation. Mr. Roosevelt's success in effecting the amalgamation was due in large part to the friendly and co-operative spirit towards the United States manifested by Mr. Matsukata, who, in addition, is a great admirer and personal friend of the late President Roosevelt and his family. Both America and Japan are to be congratulated on the outcome of negotiations which links the two nations through the greatest names of their

modern history in an enterprise which can only conduce to a closer and more friendly understanding.

The Kokusai Kisen Kaisha with a capital of Yen 100,000,000 (87,500,000 paid up) owns and operates a fleet of 51 cargo-carriers having an aggregate tonnage of 500,000. Three of these are over 10,000 tons, while 33 are classed at 9,000 and the rest at five to six thousand tons. In the new arrangement the Kokusai Company will contribute four newly built vessels of uniform size and approximately 10,000 tons freight capacity, selected from the group bearing the names of the leading ports of the world. The Roosevelt Company will also place four new Diesel engined steamers on the run. Two of these ships are under construction in Europe and will be ready for operation in May and June respectively.

The new service will be maintained westward from New York,

calling at Norfolk and other Atlantic and Gulf ports, Honolulu, Kobe, Dairen, Shanghai, Hongkong, Manila, leading ports in Java and India through Suez and European ports and back to Boston and New York. At present the Roosevelt Steamship Company operates U. S. shipping board freighters under a managing agreement. At its head is Mr. Kermit Roosevelt, with Mr. A. E. Clegg as vice-president and Mr. J. E. Willard (former American ambassador to Spain and father-in-law of Mr. Kermit Roosevelt) and A. B. Roosevelt as directors.

The new combination is a sign of the times and while confined to freight service enters the field as a formidable competitor to the new round-the-world Dollar line and with the proposed amalgamation of the Nippon Yusen Kaisha and the Toyo Kisen Kaisha, foreshadows a new line-up in trans-Pacific shipping that will have a far-reaching effect on Far Eastern trade.

Far Eastern Waterworks Problems

Hongkong, Singapore, Manila and Osaka

THE rapid increase in the population of Far Eastern cities is demanding a corresponding increase in water supply, and in order to meet this emergency many interesting engineering problems are being met and solved. The old sources of supply are becoming more and more inadequate and in island cities like Hongkong and Singapore the engineers have been compelled to seek a solution to their problems on the mainland. Hongkong, in order to expand must seek its future across the bay in Kowloon and derive its water supply from the mountains in the leased territory. This necessitates the laying of water mains under the harbor, and divers are engaged in investigating its bottom with a view to drawing up plans for carrying out the above scheme. Not long ago the *China Express and Telegraph* in an article dealing with Hongkong communications advocated the construction of a tunnel between Victoria and Kowloon in order to facilitate the rapidly growing traffic. The idea is far-fetched and perhaps impracticable at this time—but it may come to that in the end, if Hongkong keeps expanding. This would incidentally solve the water problem for the island colony.

The Singapore Scheme

The new Singapore scheme has been investigated and reported on by Sir Alexander Binnie Son and Deacon and published by the municipal council. In this two schemes have been considered, the Pulai and the Semangar, the latter a tributary of the Johore River. The Lenggui and its tributaries was not considered as the Semangar is situated much nearer Singapore and would yield all the water required without going further afield.

The report on the Gunong Pulai scheme which is ultimately recommended, touches on the main dam site, which has been proved as to foundation, Mr. Binnie's opinion being confirmed by that of Mr. Scrivenor. "Solid rock has been reached at considerably less depth from the surface than was anticipated when the estimate of the cost of the dam was made. The subsidiary dam fills up a col by means of an earth dam with an impervious diaphragm carried to a suitable depth below the surface, and raised above the top water level. This is Pulai II dam. The water of Pulai III is to be diverted into Pulai II by a weir and tunnel, the latter seven hundred feet long. The estimated yield from this reservoir is 6½ million gallons per diem. The water from the reservoir to pass through the clear water basin, 380 feet above mean sea level, thence by the pipe line by gravitation to Pearl's Hill at 165 feet, the length of main being 31 miles. No pumping required for this first instalment.

Further development contemplates the impounding of Pontian Kechil, Ayer Hitam streams I' II and III and Pulai I and Melana. The yield is estimated at 20 million gallons per diem.

Probable Future Requirements

The present water supply of Singapore is about 11 million gallons per diem and therefore this scheme can provide nearly twice the present supply.

Tables have been drawn up extending as far as the next century showing what the needs of Singapore will be at that distant date based on the assumption that the growth of the past years continues indefinitely.

"Table No. 1 contained in our report of the October 9, 1922 closed at the year 1951 and we are of opinion that little practical value can be attached to its indefinite continuation.

"We have been unable to obtain any definite figure from the admiralty officials as to the probable requirements in connection with the naval base but we are given to understand that they will not exceed 1 million gallons per diem.

"We understand that an additional quantity of 1.2 million gallons per diem is reserved as a maximum supply for the state of Johore.

"Assuming that the present growth continues indefinitely, an assumption which we hardly think is justifiable, the water flowing from the Gunong Pulai would meet all requirements for at least 50 years."

The development of the scheme involves six instalments, yielding 6.5 million gallons four instalments of 3 million gallons and a final one of 1.5 million. The first instalment is estimated to cost \$12,103,000, the subsequent ones each about 2½ millions, total \$22,258,000. All the later instalments involve the construction of pumping stations, and last of all, as the pipe is estimated to carry 12 million gallons per diem, a second gravitation main carrying 8 million gallons per diem. The total of 20 million does not exhaust the possibilities of this area, and it has the great advantage of giving the first 6½ million gallons by gravitation.

The Semangar Supply

Since this scheme has not been recommended it would serve little purpose to give the arguments for and against. Some of the difficulties are the danger of flooding, the necessity of pumping all water up 355 feet. The capital cost is slightly less than the Pulai scheme, but figures given of the cost of pumping and upkeep are in favor of Pulai during the life of the first instalment. Also the water is less pure.

"The final conclusion at which we have arrived is that the Gunong Pulai scheme affords great advantage over any other and should be adopted forthwith.

"It is urgent that a new water supply should be introduced with the least possible delay. All efforts should therefore be concentrated on the completion of the surveys of the Gunong Pulai scheme so as to enable us to supply the drawings, etc., and to allow of tenders being invited at the earliest possible date.

"We are of opinion that no useful purpose would be served by continuing investigation of other schemes," concludes the consulting engineers.

Manila's Problem

In Manila, the water problem is also pressing for a solution while the situation has become more complicated owing to the discovery that the present main crosses an important rift in the earth's surface and that in the event of a severe earth shock this main would possibly be broken, cutting off the city's water supply. The Angat river project, it is said, is situated so that the main would run parallel to the earth faults and thus would be comparatively safe from serious injury as the result of earthquakes.

For several years the head of the metropolitan water district of Manila has been urging the enlargement of the city's water supply facilities, but nothing has been done to carry out this recommendation. Meanwhile the city's population has been increasing while industrial consumption of water has also risen. If more time is permitted to elapse without the necessary increase in Manila's water supply, a serious shortage may occur during a dry season.

During the rainy season the present water supply system is quite adequate, the rainfall being heavy enough to meet all possible

current demands. But the Montalban reservoir is not large enough to take care of the city demand during emergencies such as periodically occur during the dry period, and on more than one occasion in the past has the Manila water supply come perilously near to exhaustion. With the consumption constantly on the upgrade, a really serious shortage is not beyond the realm of possibility, nor even probability.

Of the various projects for increasing the Manila water supply which have been suggested, the one that meets with most favor among experts is the Angat river project. Engineers declare that at a comparatively small outlay of money—about P.15,000,000—this project when completed will take care of the city's needs for many years to come. As it will take several years to complete the project and as the present supply is constantly becoming less adequate, immediate action towards its consummation is urged by business organizations.

Osaka's Huge Program

In Osaka another huge waterworks undertaking has been investigated and reported on by the local water bureau. This contemplates nothing less than using the waters of Lake Biwa after their discharge from the great hydro-electric plants on the Uji river for supplying the cities of Osaka, Kobe and Sakai with their neighboring towns and villages. The plans provide for the building of an aqueduct which will carry something like 343,000,000 gallons per day. Some notes on the Osaka waterworks appear in this issue of THE FAR EASTERN REVIEW in the article on "Osaka's Municipal Enterprises."

The Racial Issue Revived

JUST about the time Americans and Japanese begin to look ahead to an era of good-will and business co-operation new issues which try the patience of both sides are created by the enactment of some new immigration or land law in the United States or some unexpected anti-Japanese movement in China. Japan has been told in no uncertain manner that she can expand no further. Manchuria, a natural outlet for her increasing millions is closed to her colonization on a large scale; Mongolia offers no solution to her problems of population: she was invited to get out of Siberia and is now told to practice birth control. Does Japan try by legitimate methods to save herself from economic disaster by creating industries or developing mines in China; does she seek foreign loans to develop Korea or her zone in Manchuria, there are Americans who can be depended upon to set up a terrific *yakamashi* and charge her with harboring aggressive designs on the integrity of China; when Japan obtains a few paltry millions for reconstruction purposes this same element hastens to cast suspicion on her motives by spreading the report that the funds are to be employed in obtaining control of China's cotton industry. As soon as one judicial question is decided which clears up some point in the interminable immigration snarl, another issue is immediately created and when a plan is considered by the American congress that will not discriminate against Japan, professional jingoists accuse the government of having surrendered to American capitalists interested in large reconstruction loans and contracts. Just when this issue seems in a fair way to be settled amicably, along comes the United States court for China and challenges her position in the Kwantung leased territory. And so it goes.

No other nation have been subjected to such continuous pin-pricking over such a long period of years as Japan has been compelled to stand from the United States, while the deplorable part of it is that the prevailing anti-Japanese sentiment arises largely from localized conditions in various western states which are seized upon by politicians and agitators in catering to the labor vote. The higher authorities at Washington have invariably recognized the legitimacy of Japan's reasonable demands for equality of treatment, and the Japanese authorities have as often met the American

government in any solution of these questions that would enable them to maintain their self-respect.

It is only a few short months since Ambassador Woods departed from Tokyo on an urgent visit to the United States. It was a memorable occasion. Japanese of all classes busily engaged in clearing away the debris of the earthquake and burying their thousands of dead paused long enough in their task to show how much they appreciated the help they had received from America. The American ambassador drove to the railway station through throngs of cheering men and women whose *banzais* came from hearts that were burdened with grief. School children crowded the wharf at Yokohama up to the hour of his departure singing the American national anthem and saluting the ambassador with American flags. This demonstration came from hearts overflowing with a sincere gratitude and friendship, brightened by the hope that an end had come to misunderstandings between the two nations.

Ambassador Woods had carried to the business-men of Japan the message of his government that it welcomed co-operation between the two nations in commerce, finance and industry and that his special mission was to encourage and bring about such partnerships. As a result, the great Mitsubishi firm and the equally important Westinghouse interests came together in a new undertaking for the manufacture of electrical apparatus in Japan: the names of Roosevelt and Matsukata are linked together in a round-the-world shipping venture and other American-Japanese combinations are being considered. Japan has sent her commissioners to New York to arrange the terms for the first installment of a series of loans required for reconstruction purposes while many American concerns have received large orders for materials which represent merely the preliminary requirements for a rebuilding scheme that will take ten years or more to carry out.

Japan is America's best customer in Asia and will continue to be so for another decade or more. American exports to Japan year before last permitted our mills to operate full time and provide employment for the workers. Japan's purchases of American products for the next few years will likewise assure prosperity to countless industrial establishments scattered throughout the country

and provide remunerative labor for hundreds of thousands of skilled mechanics.

Yet we are doing our level best to destroy this friendship and drive the Japanese to other markets for their requirements by catering to the race prejudices of a very small element in our population residing on the Pacific coast. In upholding the constitutionality of the last California anti-alien law aimed directly at Japanese settlers, some 30,000 Japanese farmers will be compelled to abandon 500,000 acres of land in California which they have been industriously cultivating. California will remain white, but it is certain that white Americans will never raise the 90 to 95 per cent. of vegetables and fruits now produced by the patient and hard working Japanese.

Probably 30,000 Japanese out of a total of 110,000 residing in the United States will be affected by the California anti-alien land law of 1920 under whose provisions Japanese, either as individuals or corporations in which Japanese are interested, are prohibited from owning or leasing land. This also applies to American-born Japanese children (duly recognized as American citizens) unless they are removed from the guardianship of their parents who are ineligible for such citizenship. The constitutionality of this law has been upheld by the supreme court but its enforcement will not solve the problem for the people of California. It will not rid the state of those Japanese legally entitled to reside there and who, under another ruling of the supreme court are entitled to earn their living in their own way. The dispossessed Japanese agricultural land holders will simply transfer their activities from the farms to the towns and engage in industry where competition with American labor is likely to prove more harmful than if they had remained on the farms where labor is scarce.

A bill introduced in congress which excludes Japanese from entry into the country has been favorably reported on by the immigration committee of the house. Before it can become a law, however, it must first pass the house, then the senate and then receive the president's signature. It is difficult to believe that a bill which discards the "Gentleman's Agreement" for a law which specifically excludes and discriminates against Japanese subjects will receive the sanction of the senate or the president, and it is safe to assume that some equitable arrangement that will place Japanese on an equal footing with Europeans will be adopted in order to retain Japan's good-will and preserve our own traditions for square dealing. Japan has lived faithfully up to the provisions of the "Gentleman's Agreement" and to set this aside by the enactment of a law which deliberately questions her good faith can only lead to a situation that will be equally deplored in Japan as well as in the United States. The restriction of Japanese immigration into America to two per cent. on the same basis as Europeans under the 1890 census, would reduce her quota to 240 and involve no discrimination or loss of dignity.

The passage of any immigration law that needlessly insults the Japanese would lead inevitably to a crisis in Japanese-American relations and sow the seeds of a future world war. In a recent debate in the Japanese diet, Dr. Kanasugi warned the government that America was most erratic in her conduct of foreign relations and that it was wrong to base national policy on American good-will and sympathy. "The American-Japanese question has now ceased to be a political issue as far as the Japanese nation is concerned: it has become a question touching on our national dignity which transcends all domestic party differences," says the *Osaka Mainichi* reflecting popular Japanese opinion on the subject. On the other hand, the Japanese minister for foreign affairs in responding to Dr. Kanasugi expressed the opinion that an appeal to the justice of Americans will succeed in bringing about a satisfactory solution of the problem, and in this he reflects the general attitude of the state department, which although officially silent, is reported to be sympathetic with the Japanese viewpoint. The bill raises another acute question with Japan and unless a fundamental settlement based on equality of treatment is arrived at, there is small hope of permanent friendly relations between the two great nations. The Japanese say in effect: "enact all the immigration laws you please. It is your country and you have the right to say who shall enter it, all we ask is that you do not discriminate against us because of our color or other characteristics." Their request is reasonable and just and the sooner an end comes to these periodic recurrences of racial outbursts the better for the peace of the Pacific and the world.

Wanted—A Decision

IF France continues to obstruct the holding of the special tariff conference in Peking because of the gold franc or any other issue, let the United States, Great Britain and Japan hold a conference of their own with China and determine upon the revision of China's customs arrangements. If France then refuses to pay increased duties it will affect very little, because French trade is only a small percentage of the total.

The unrest apparent in every province, the annoyance to foreign trade from illegal taxation, the impossibility of settling outstanding questions because everyone is waiting for the conference to take place, is costing foreign and Chinese traders too much. Illegal taxation is a damnable proposition because it undermines the very existence of foreign trade in China and the position of the foreigner in the country. But when the Chinese give as an excuse for their failure to enforce the national will on the provinces that the Washington conference agreements have not been lived up to and that one treaty is as good as another—there is no reply. For the Washington conference agreements have been ignored and will remain ignored if the powers wait for French ratification. Great Britain, the United States and Japan are morally bound to see to it that a treaty between China and a foreign power shall not be broken—by either side. As it is at present, the Chinese can point to the most important agreements regarding their country ever entered into being delayed in fulfillment, perhaps broken, because of the unwillingness of one power to go through with the deal. The gold franc issue was not brought up at Washington. It has nothing to do with the treaties written there. It has nothing to do with the revision of the tariff. It has nothing to do with any of the questions involved. France and China are members of the league of nations. Let them take the gold franc issue there—but let that be no impediment to the holding of the tariff conference.

Twenty-five Years of Successful Co-operation in Japan

(Continued from page 87).

Works, Limited, established in 1908, manufacturing a complete line of wires and cables of every description. It is with this corporation, now formed into a limited company, that the Nippon Electric Company is affiliated.

The Sumitomo Electric Wire and Cable Works, Limited, has a large factory in Osaka, with modern buildings and up-to-date equipment. It was here that the first paper-insulated telephone cable made in Japan was manufactured, and it is interesting and significant that, after the affiliation with the Nippon Electric Company (in 1920), the first quadded telephone toll cable made in Japan was fabricated in these same works, and the Company is now fully equipped to manufacture Western Electric types of toll cable.

The years 1921 and 1922 were active years in building construction for the Nippon Company and the eighth factory, three stories of reinforced concrete, was erected, providing 43,000 square feet of additional floor space. Later, the ninth and eleventh factories (84,000 square feet in total) were started, in anticipation of increased requirements by the government department of communications.

During the past few years consistent work has been done looking toward taking up the manufacture of new and up-to-date equipment for telephone systems.

The manufacturing branch has developed and is working under a functionalized organization; consistent progress is being made in the improvement of protective devices and exhaust systems for removing dust and objectionable vapors, and fire prevention equipment is constantly being improved.

This brings us through twenty-five years of progress; the future holds bright promise for another period of development and progress for the Company.

Osaka Municipal Enterprises

OSAKA, the commercial and industrial heart of the Japanese empire stands on a broad plain midway between Kyoto and Kobe, covering an area of 23 square miles in the southeastern corner of the province of Settsu fronting the island of Awaji and the gulf of Osaka. Occupying as it does, the centre of

the empire for national communications, Osaka is the vital point in commerce and industry, and in consequence of its extensive level environs the lands have been largely bought up and utilized for factory sites. As a manufacturing centre Osaka is pre-eminently ahead of all other cities in Asia. Enormous spinning mills raise their towering chimneys everywhere within and without the city and in addition there are factories of vast extent and capacity turning out every conceivable product. The census of 1920 gave Osaka 4,641 factories of all kinds employing 94,982 workers and turning out products valued at Y.558,726,312. Side by side with its industrial progress have grown up great banking institutions that exert an enormous influence in the financial circles of the empire, while houses like the Sumitomo, the Fujita, Konoike and Kuhara are known throughout the world. The trade of the

city has trebled since the outbreak of the war, from Y.144,433,590 in 1915 to Y.410,930,441 in 1921. Of this last Y.292,057,917 was exports. With a population of 1,346,471 within the municipal area in 1921, and another two millions or more in neighboring districts, the problems confronting the local governments are many and difficult of solution.



The New Osaka Municipal Building

When the old system of government came to an end with the beginning of the Meiji era, Osaka came directly under the control of the imperial authorities. In 1889 some measure of self-government was accorded to Osaka. The city was divided into 548 streets, which increased to 620 a little later. Subsequently the city was divided into four wards with 903 streets. When self-government was finally conceded to cities, Osaka established a municipal office, a mayor and attendant officials were appointed, and a modern system of

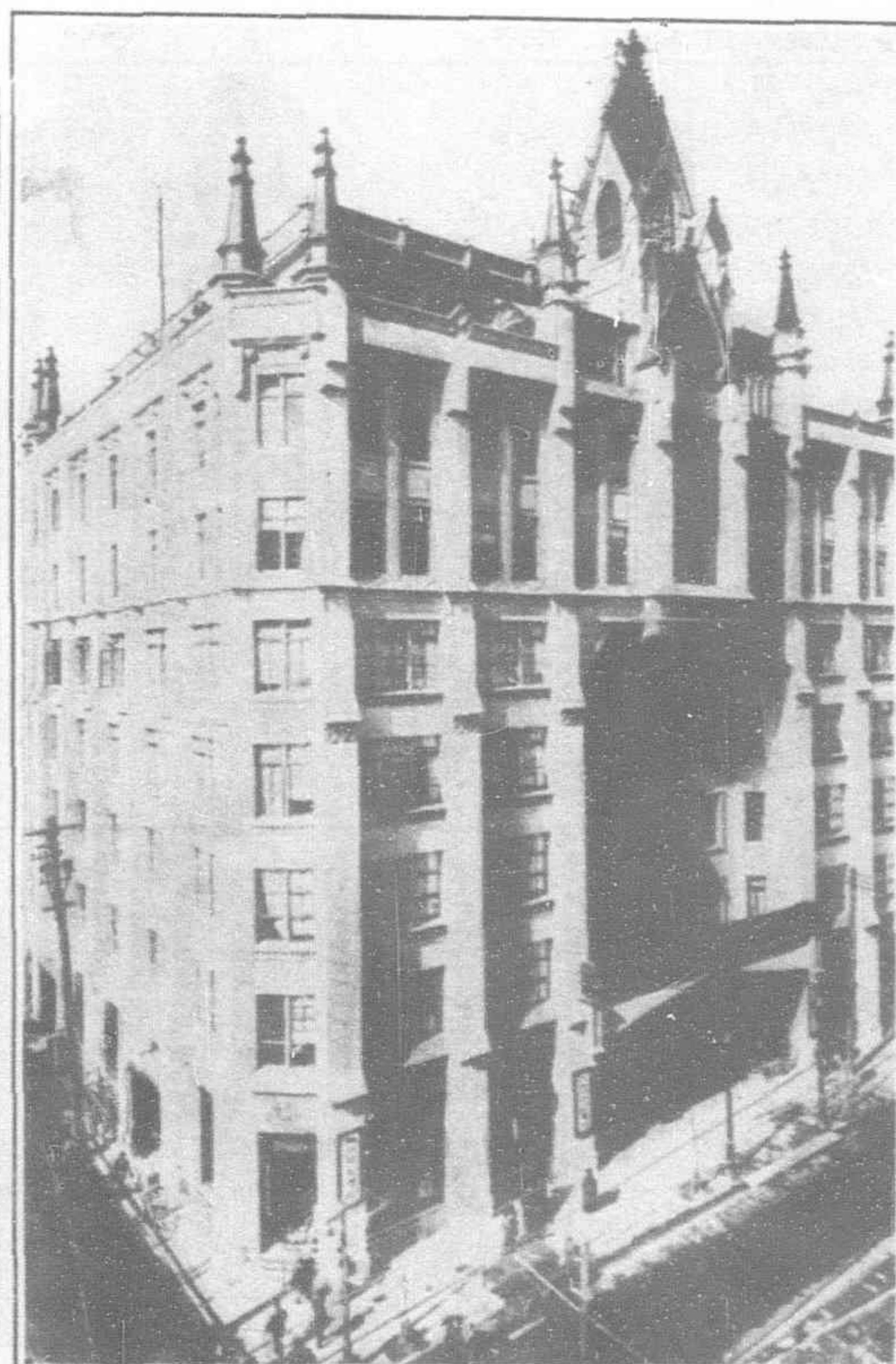
city administration began. The mayor has under him two deputy mayors, a treasurer, and an assistant treasurer, and there are eight departments of city government; namely, commerce, industry, education, miscellaneous affairs, waterworks, engineering, sanitation, and accounts; while the electric bureau manager



Mitsukoshi Department Store



Takashimaya Department Store



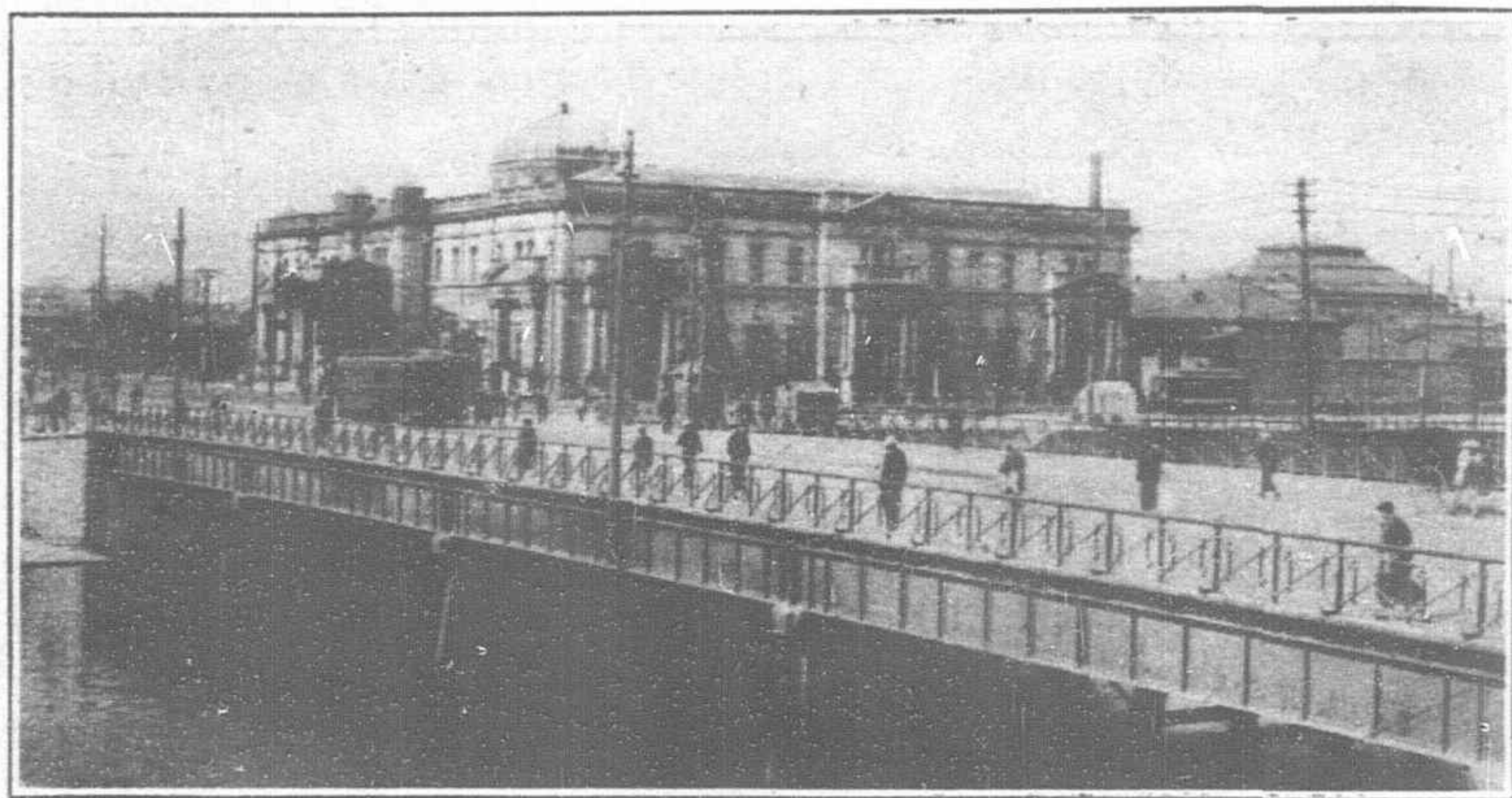
Shirokiya Department Store

MAGNIFICENT MODERN DEPARTMENT STORES OF OSAKA

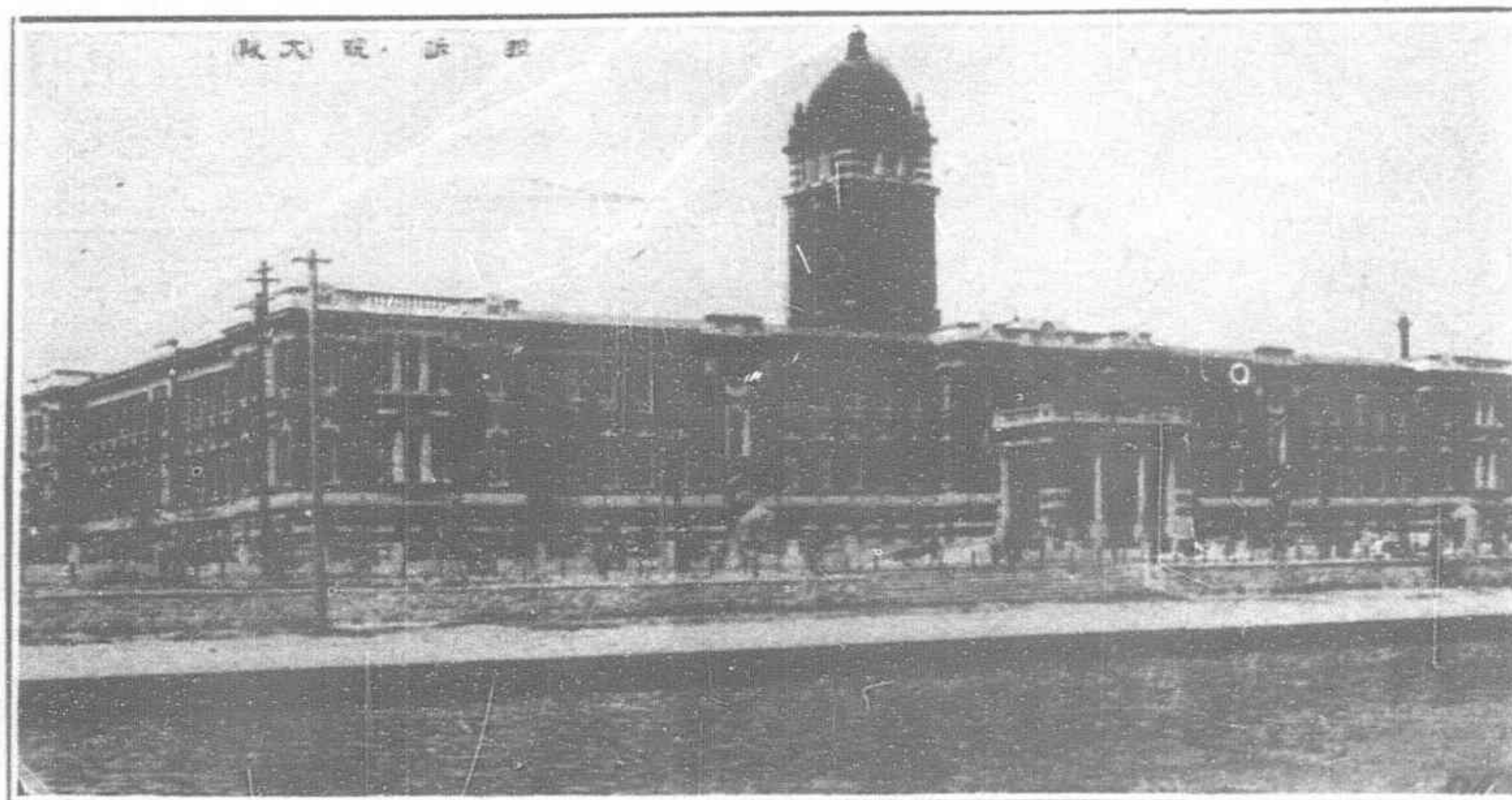
the city lighting system and a harbor committee attends to affairs pertaining to shipping. The city administration is directly under the supervision of the mayor, who enjoys a large measure of initiative, but he is bound to consult the aldermen's council in matters relating to finance. The municipal assembly, comprising 60 members, has to pass all important undertakings before they can be proceeded with. There are also ward councils, which manage affairs pertaining to their respective wards.

vessels having a gross tonnage of 430,000. The municipality has embarked on a large scheme for still further enlarging its port facilities and when all the piers and warehouses now planned are erected with their cargo handling apparatus, Osaka will take its place in the fore front of Japanese ports.

The following notes on the waterworks, electrical undertakings, harbor program, road and street construction, etc., compiled by our Osaka correspondent from the municipal reports of the current

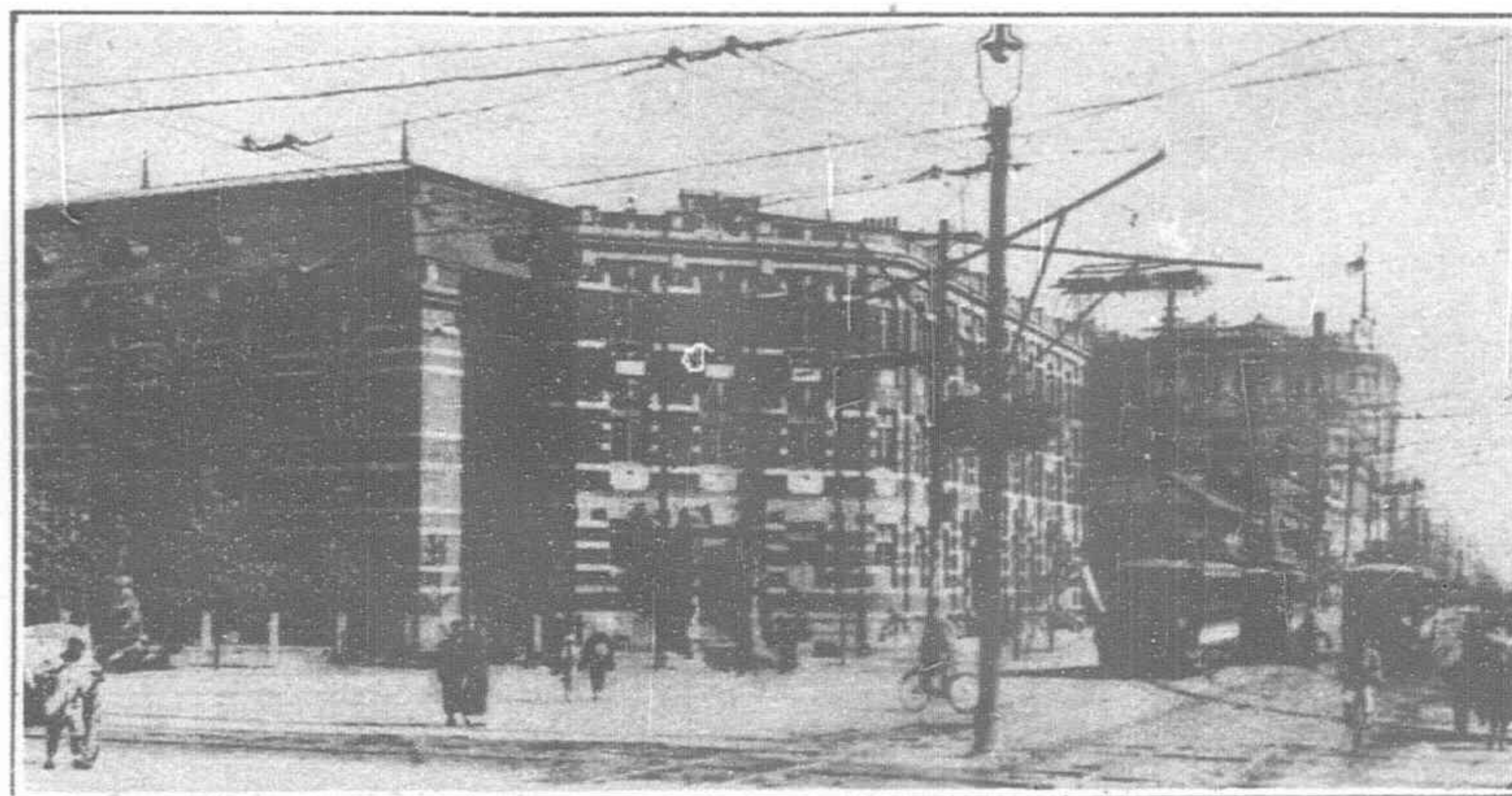


Bank of Japan at the Oebashi



Court of Appeals

Under the present form of administration various improvements have been carried out in the city, or started with hopes of completion. Among the more important of these is the construction of an adequate system of waterworks and the sanitation of a flat low-lying district difficult of drainage. Last October, the city government took over the private electric light companies and tramways and is faced with many difficult problems involved in their improvement and extensions to meet the

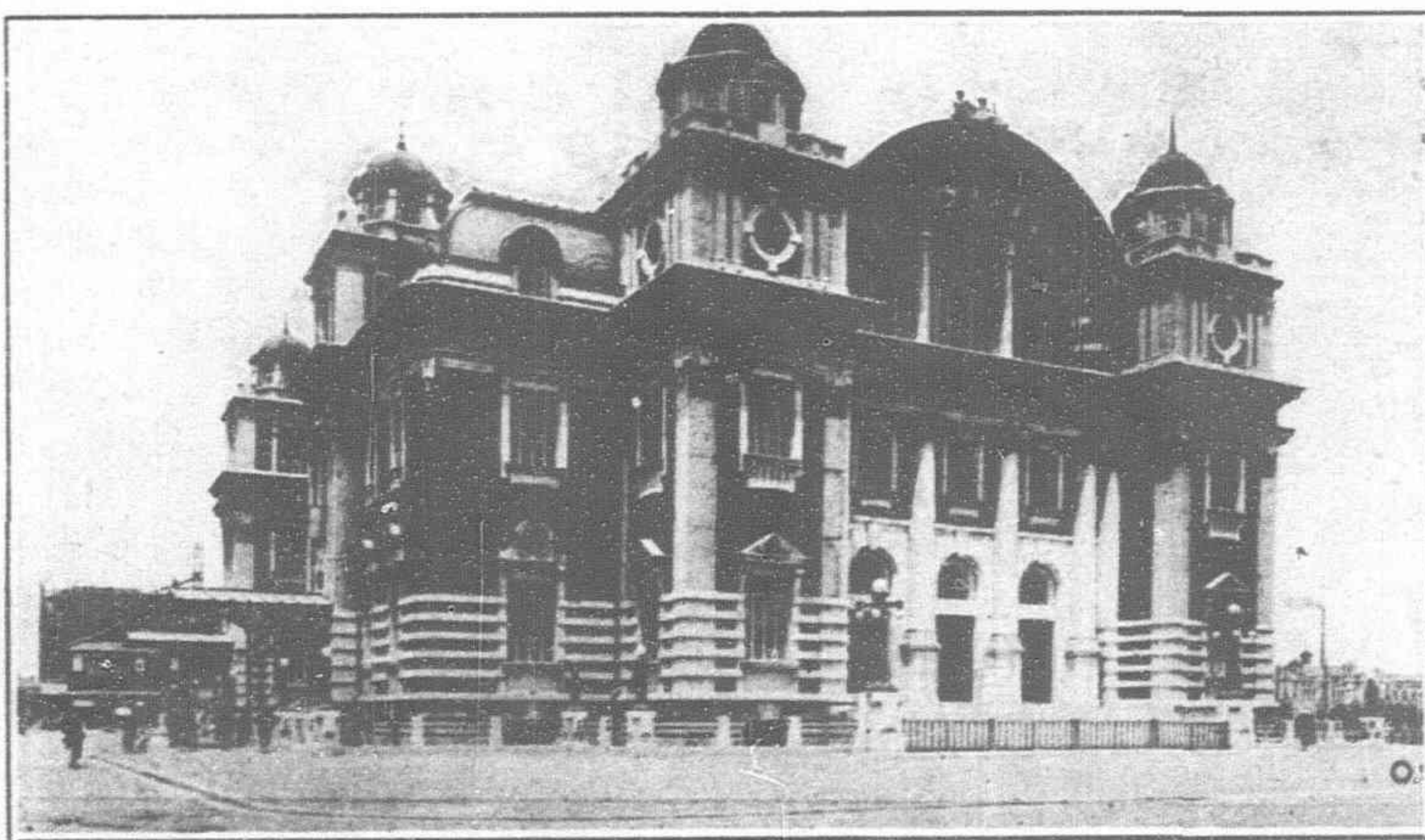


Kitahama Stock Exchange

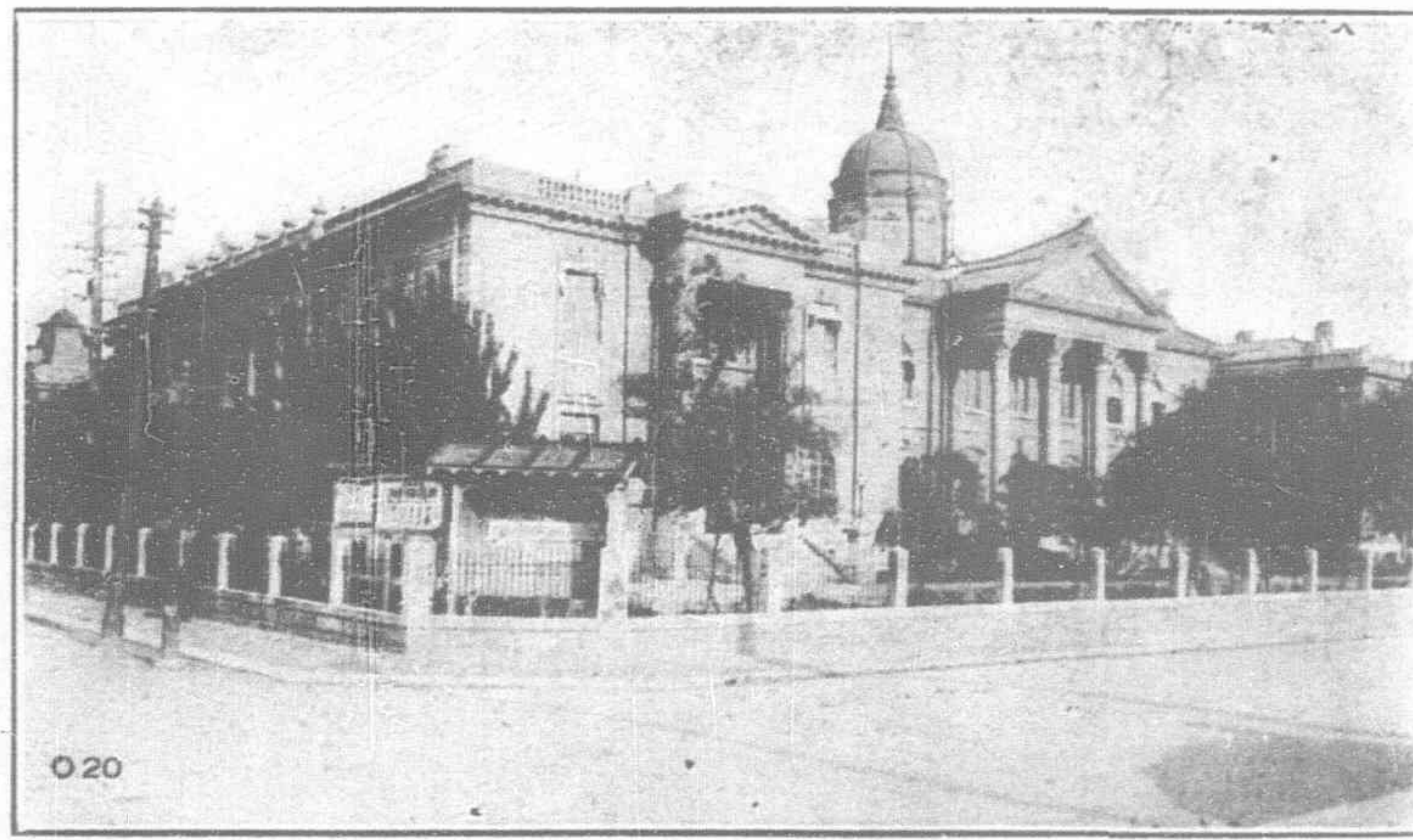
year will give some idea of the vastness of the work confronting the various public works departments.

Municipal Waterworks

The city of Osaka obtains its regular water supply from the Kunishima municipal waterworks completed in March, 1922, at a cost of Y.19,880,000. These works cover approximately 125 acres and are composed of two sand filtration ponds, each 49.7 yards long by 11.9 yards wide with a depth of 10 feet, or a total filtration area



Public Hall of Nakanoshima



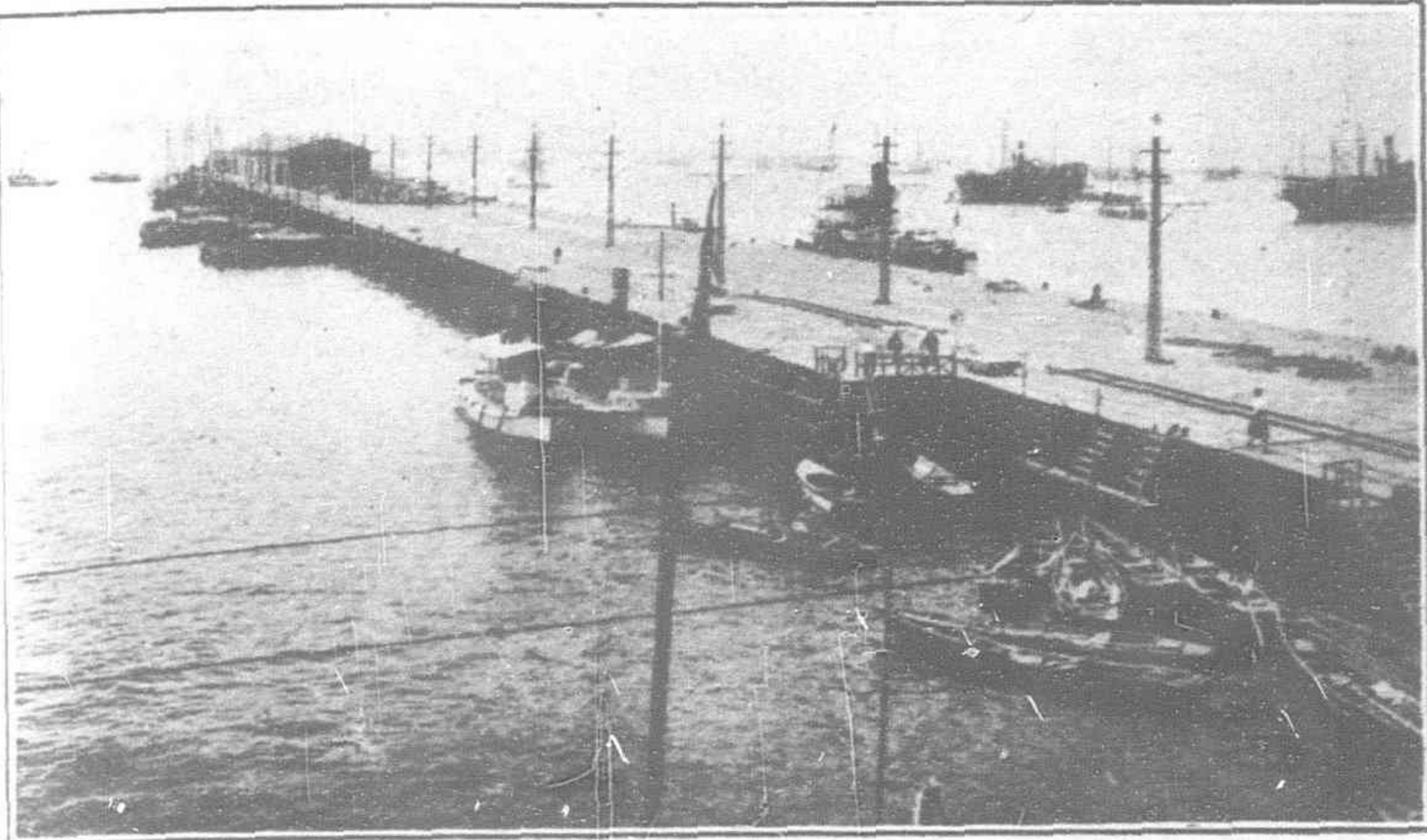
Prefectural Government Office

OSAKA'S HANDSOME PUBLIC BUILDINGS

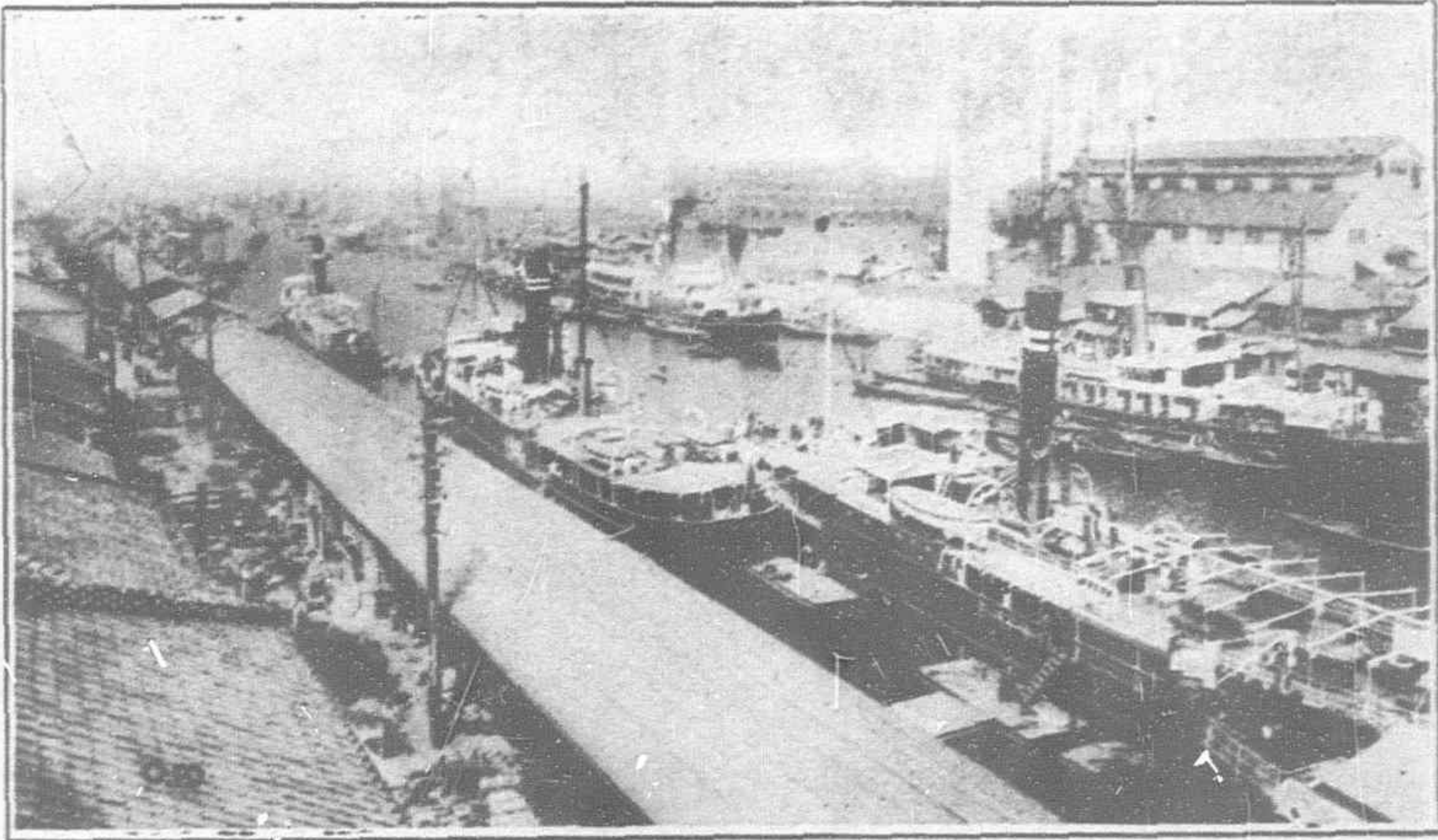
constantly growing needs of the community. The figures for 1921 show that the number of passengers carried by the municipal tramways was 267,092,806 producing a revenue of Y.15,223,643 in fares.

Although Kobe is the deep water port for the Osaka district the requirements of commerce has compelled the construction of harbor works and the improvement of the river for the accommodation of light draft steamers and the thousands of coastwise sailing vessels which carry the products of Osaka to all parts of the empire. Much of Japan's Oriental trade is carried on through the port of Osaka, the home of the great Osaka Shosen Kaisha with its 133

of 1,183 square yards. There are six intake pumps with a capacity of 464,490 gallons each per hour and three others with a capacity of 659,020 gallons each per hour working against a head of 28 feet, making a total capacity of 1,123,510 gallons per hour. There are ten settling ponds having a total area of twenty acres and a capacity of 63,639,000 gallons: twenty-four filtering ponds, thirty-two acres in extent, filtering 84,640,000 gallons per day: six reservoirs, with a total area of eight acres, having a storage capacity of 27,472,400 each. There are twenty-one distribution pumps (five held in reserve) delivering 4,446,400 gallons per hour in the distribution mains whose total length is over 468 miles. The diameter of the



Another View of the Jetty



The Hustling Banks of the Ajikawa

OSAKA'S BUSY HARBOR

mains ranges from 3½ to 42 inches. The maximum supply per hour is 5,349,000 gallons.

The water supplied by the municipal waterworks for the fiscal year 1922 (April 1922—March, 1923) is as follows. One koku equals 39.7 gallons :—

Domestic and business, by private water-hydrant					128,433,600	koku
Domestic and business, by common (street) water-hydrant					72,098,259	"
Public baths					49,655,250	"
Steam generators					8,749,413	"
Ships					2,307,651	"
Government buildings					4,922,996	"
Military barracks					1,033,705	"
Fountains and ponds					228,431	"
Supply in suburbs					44,317,397	"
Municipal and fire fighting					116,217,399	"
Total					427,964,106	koku

The average daily consumption for 1922 was 46,548,409 gallons with a maximum demand (August 7) of 58,920,478 and a minimum (January 1, 1923) of 32,255,734 gallons.

Outline History of the Osaka Waterworks

The city of Osaka completed its original waterworks installation at Sakurano-miya in 1895 and commenced its first two-year extension program in

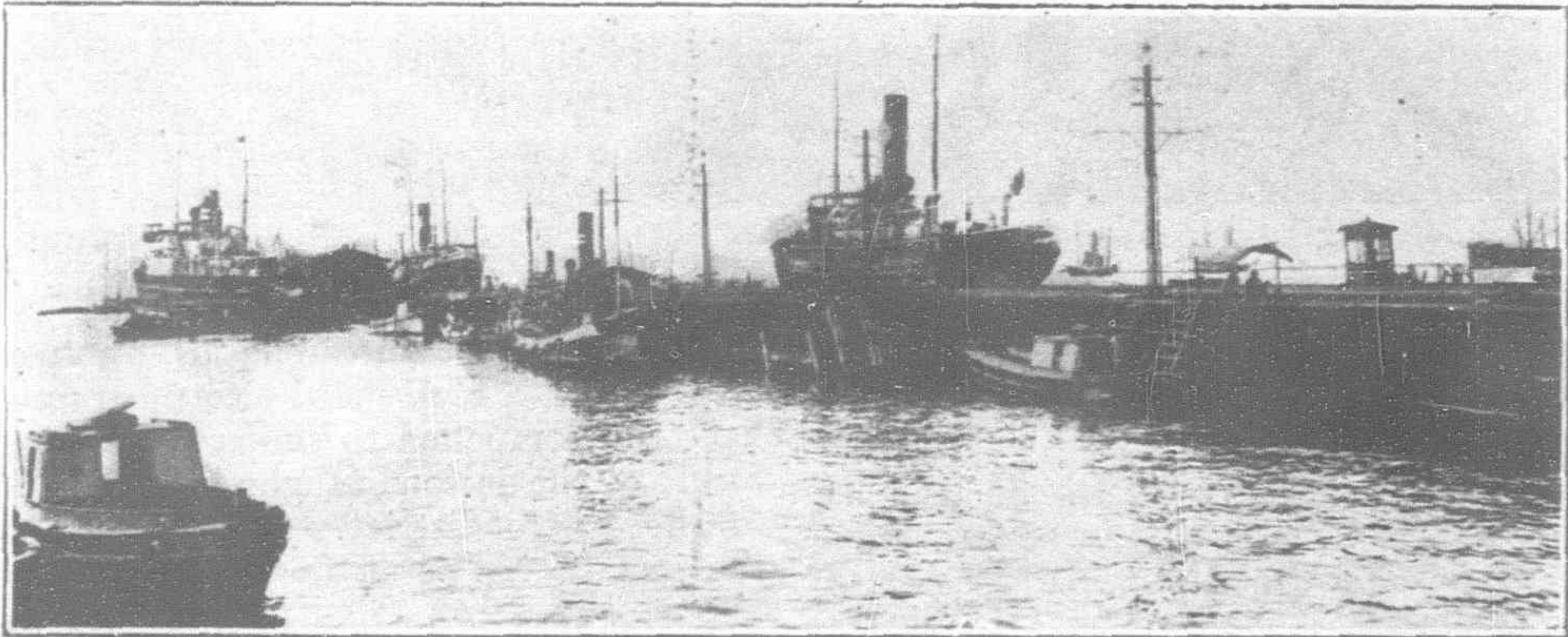
1900. Since then, the system has been continually improved and extended to meet the demand caused by the steady increase of population. During the first five years following the first extension the population outgrew the capacity of the original plant at Sakurano-miya, necessitating the construction of an additional plant to supply the increased consumption. In 1908, therefore, the municipal authorities appropriated the sum of Y.9,480,000 for the construction of the new Kunishima waterworks which was completed in 1916. A further extension was added in 1919 at a cost of Y.10,400,000, the work being terminated in March of last year.

The budget for the current fiscal year is now under examination by Mr. Sawi, chief of the water works bureau, and will be passed together with the general municipal budget by the city assembly. This budget is based on supplying an average of 59,550,000 gallons daily, with a maximum of 75,430,000 gallons. The ordinary expenses of bureau for 1924 are placed at Y.1,187,000 in addition to Y.528,000 for engineering work and improvements while the income is estimated at Y.3,975,000, showing an estimated profit of Y. 2,788,000 for the year. The surplus to be carried forward from the current fiscal year is Y.500,000 giving a total surplus for 1924

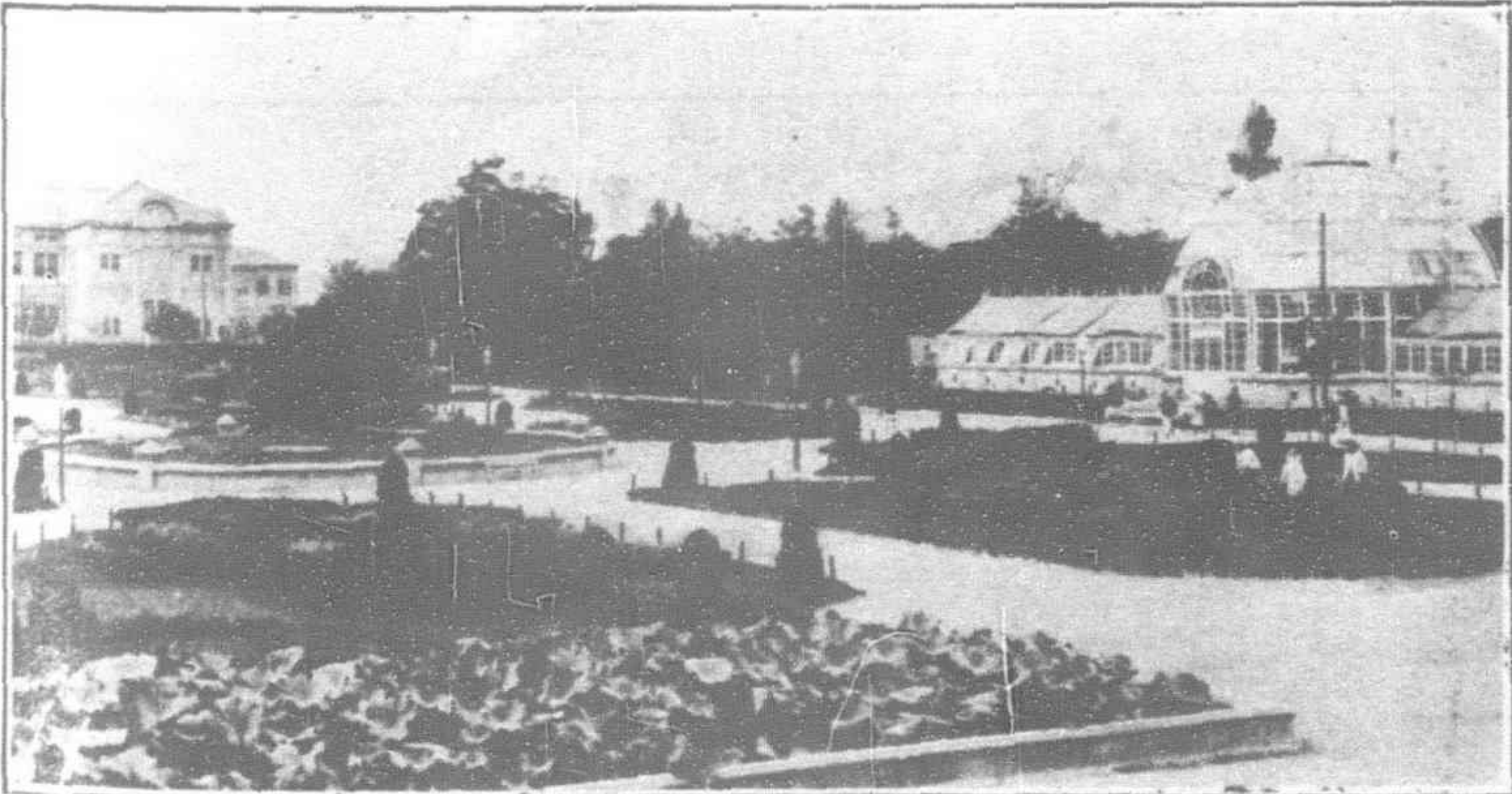
of Y.3,288,000. Of this, Y.1,167,000 is to expended for new equipment and meters: Y.1,283,000 for the redemption of waterworks bonds due in 1924 and Y.240,000 for redeeming other bonds issued by the municipality for improving the sewage system and harbor works.

Future Plans

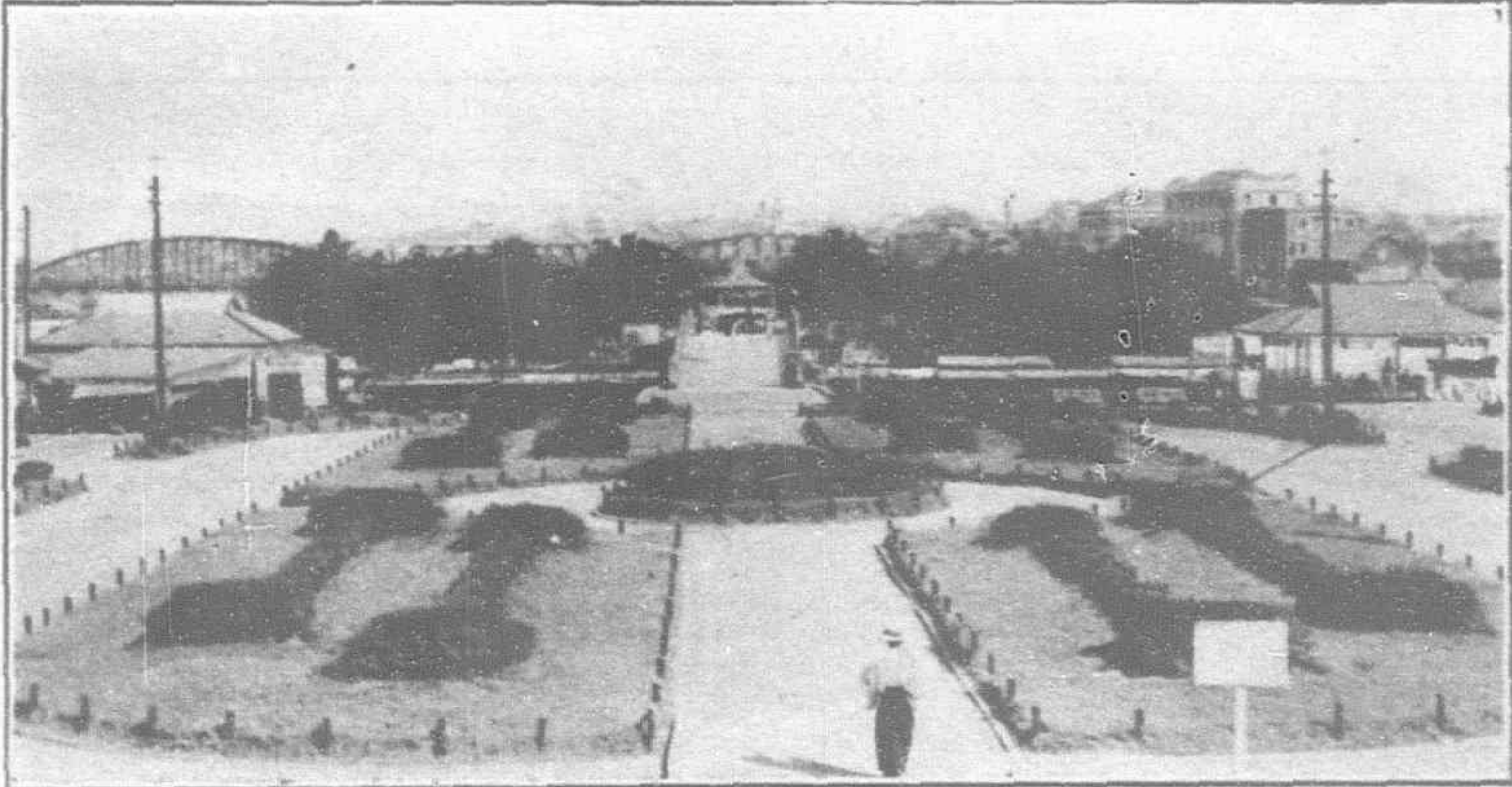
The abnormal growth of Osaka with



The Deep Water Jetty

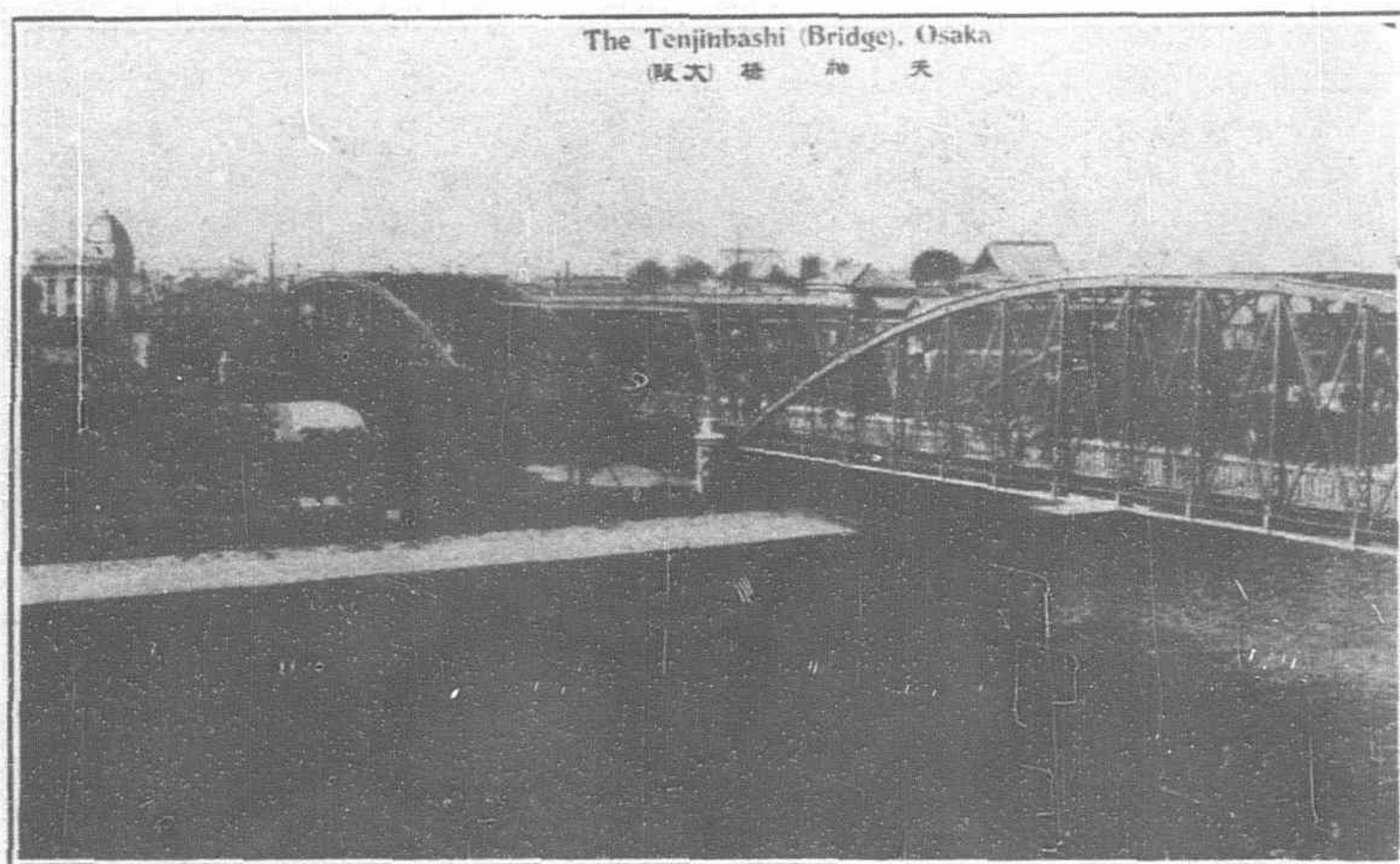


Tennoji Park

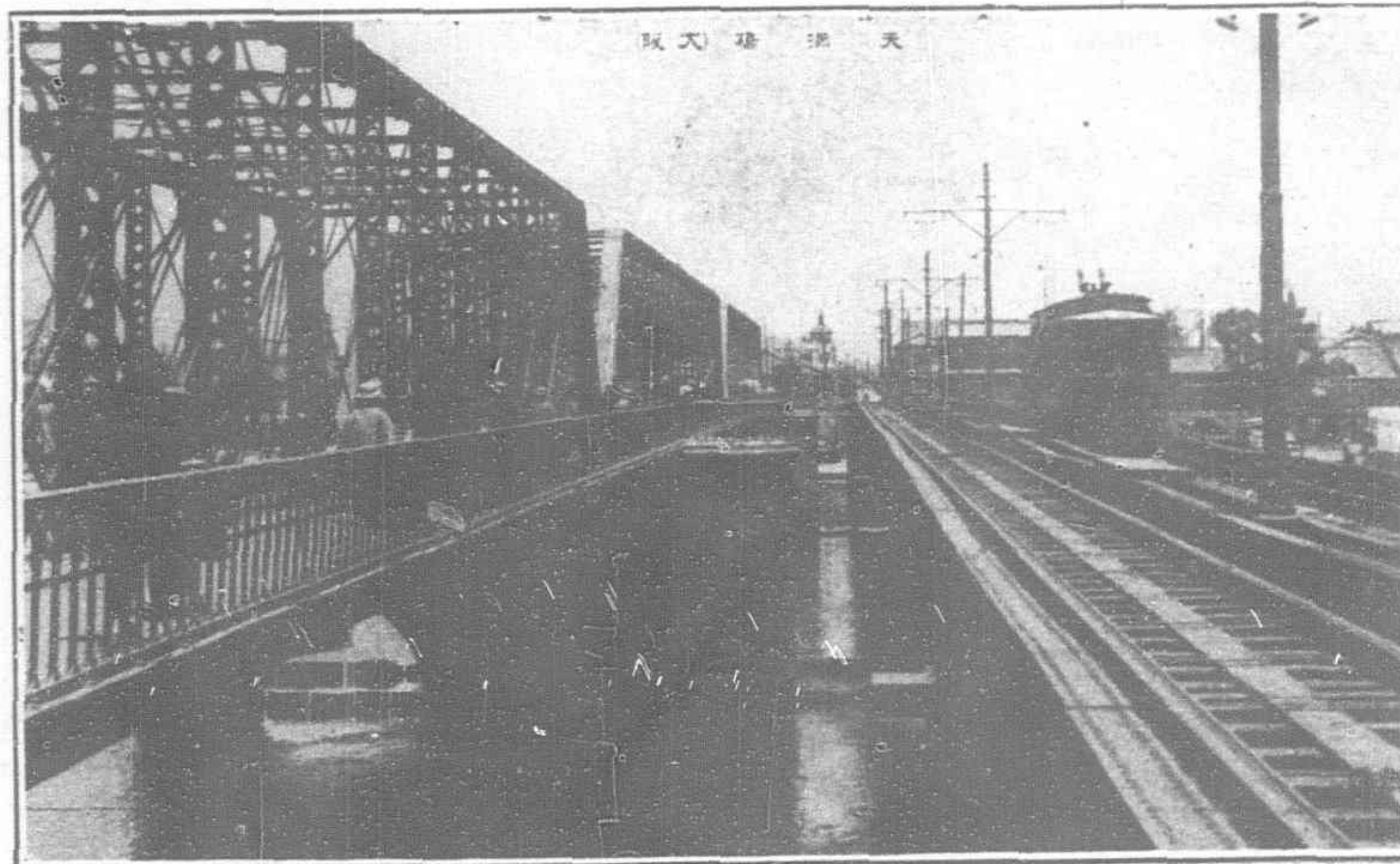


Nakanoshima Park

THE BEGINNING OF A BEAUTIFUL PARK SYSTEM

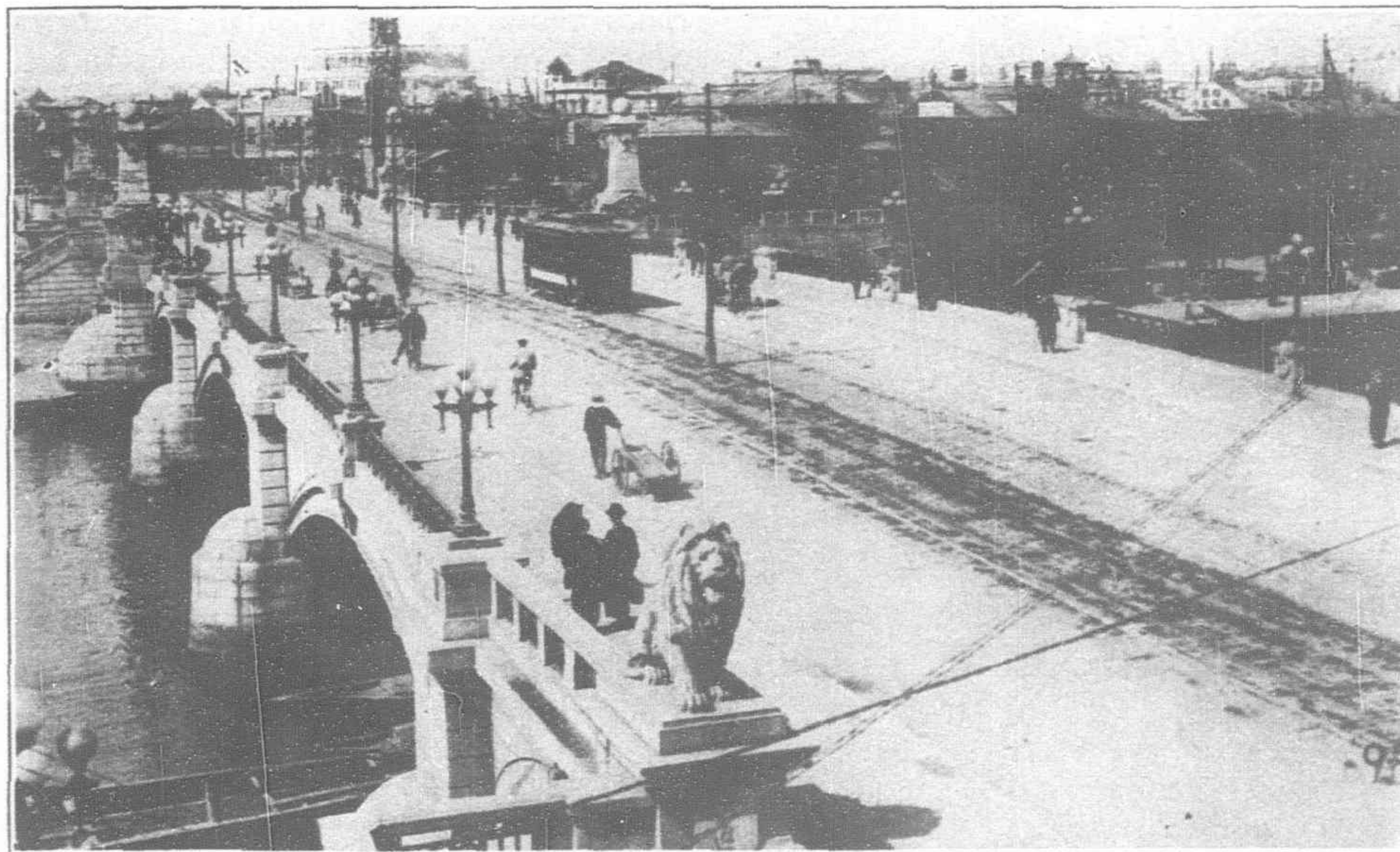


The Tenjinbashi (Bridge), Osaka
(大阪) 橋 天 津



The Tenmabashi Bridge

its great industrial establishments has compelled the engineers to look far afield for a supply that will assure the future development and needs of the city and its dependencies. The waterworks bureau has completed investigations for using the waters of Lake Biwa for a huge program that will supply not only Osaka but Kobe and Sakai with the neighboring towns and villages. Owing to the opposition of the people living in the villages on the shores of the lake to any further lowering of its level, the bureau plans to utilize the waters discharged by the Ujigawa hydro-electric plants located in the lower end of the Uji river. The quality of the water here is excellent the number of bacilli being only 483 as compared with 6,000 in the water of the Yodo river. The quantity to be supplied under the new scheme amounts to 251,800,000 gallons per day distributed as follows :



The Heart of Osaka: The Naniwa Bridge

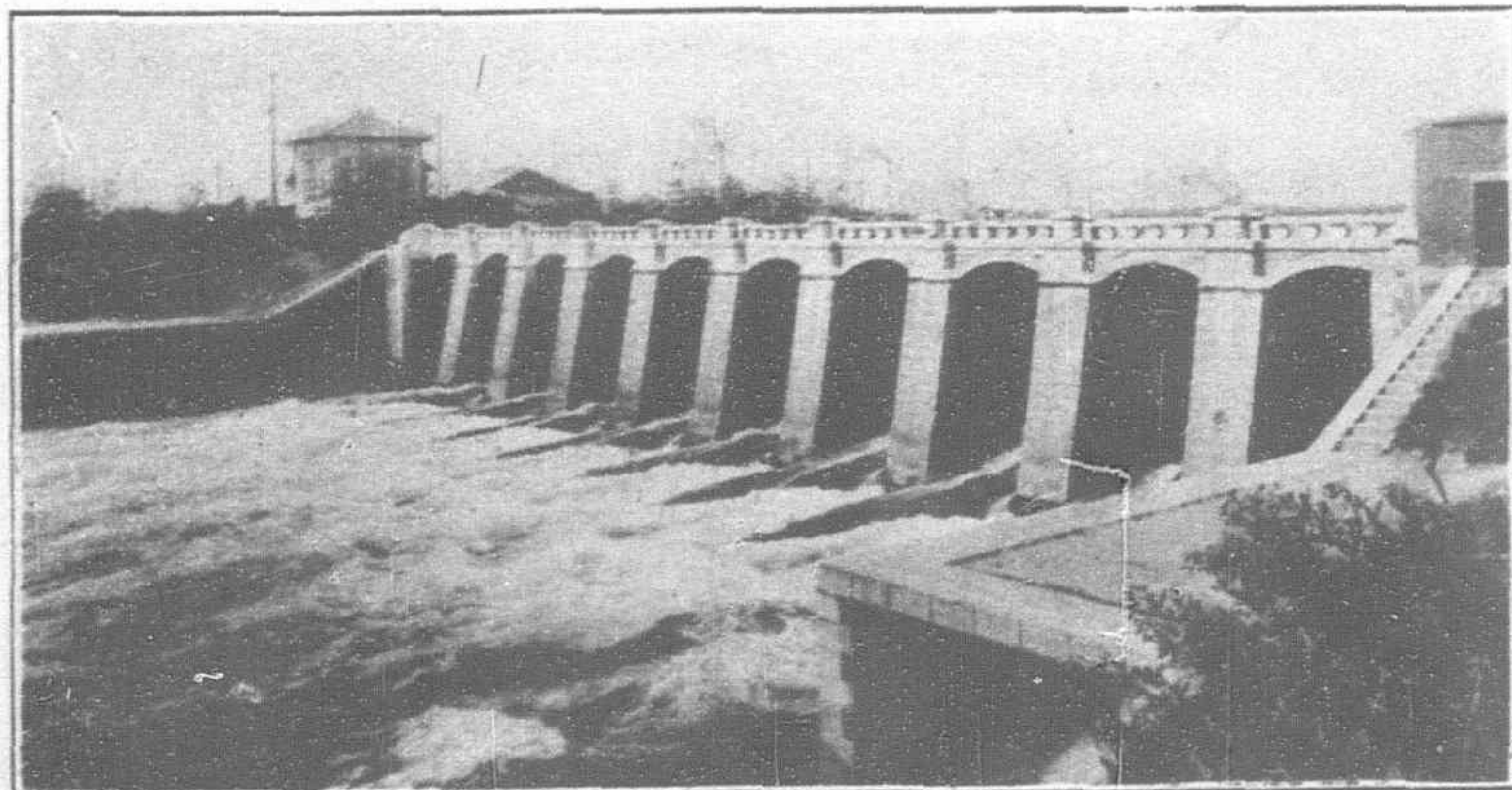
Districts	Gallons.
Osaka	158,800,000
Kobe	79,400,000
Towns and villages between Kyoto and Osaka ...	2,900,000
Towns and villages between Osaka and Kobe ...	12,300,000
Sakai	8,400,000
Total	261,800,000

The aqueduct to be built along the left bank of the Yodo river will carry approximately 343,000,000 gallons per day. This location has been selected after careful investigations because of the nature of the soil and lower cost of construction. However, the work as planned at present is to be carried out over a long period of years.

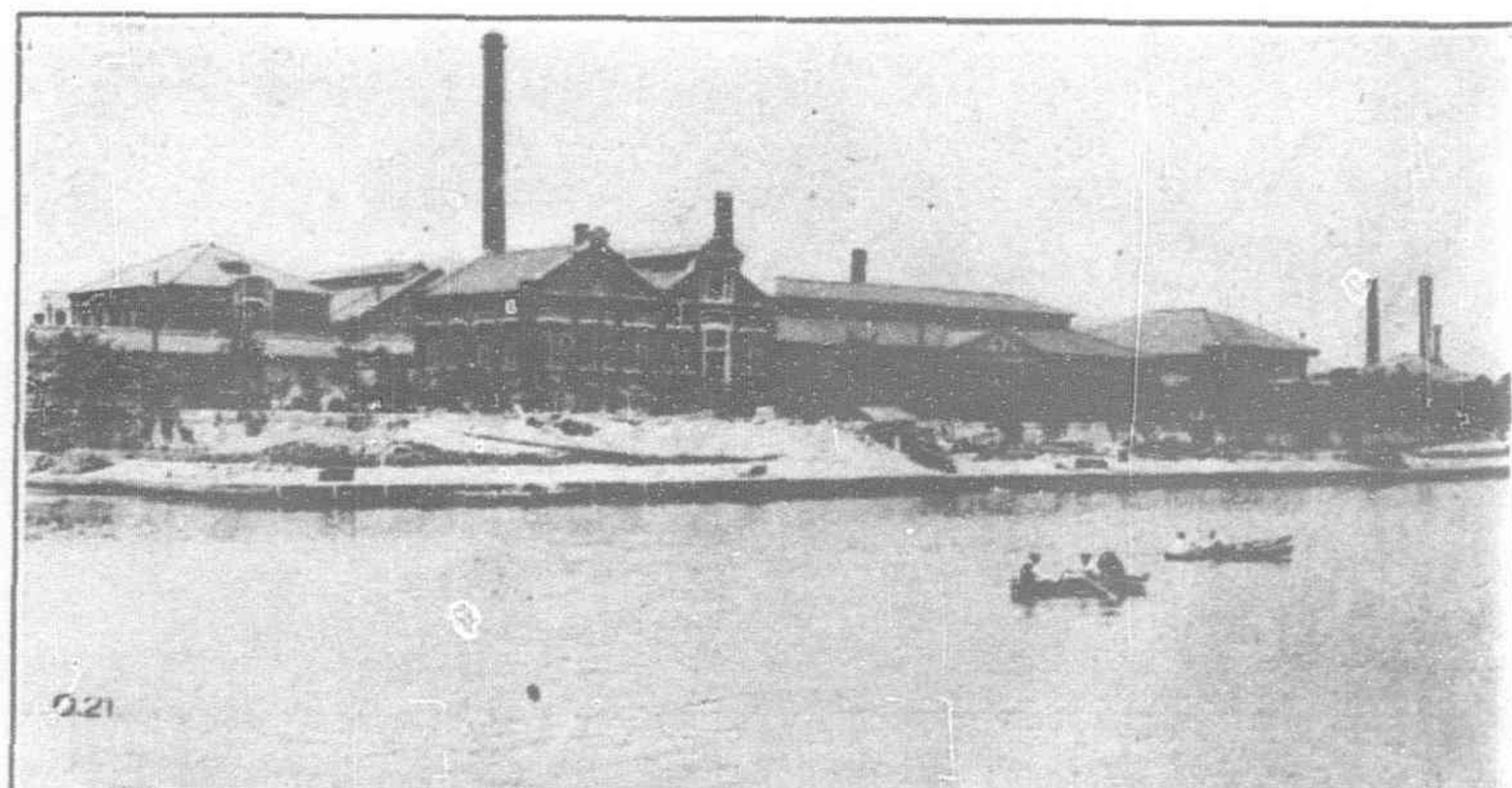
Municipal Electrical Enterprises

After protracted negotiations the Osaka municipal government purchased the properties and rights of the Osaka Electric Light Company and took over and commenced to operate the plant on October 1 last. The operation of the electric railways in and around Osaka was also included in the municipal scheme. The municipal electric bureau has drawn up and completed plans for the operation of a high-speed electric tramway system in the city but has been compelled to subject it to extensive modifications as a result of the lessons taught by the earthquake of September last in the Tokyo district. One of these modifications will embrace the installation of an underground tramway system.

The electric bureau has recently decided to adopt the single hanging wire system for the municipal tramways and equip all the cars with a single trolley pole and better safety guards. At the end of July, 1923, the city had 464 single tram cars, 150 ordinary



The Kema Komon (Lock Gate)



The Mint, Osaka

bogie cars 245 low truck bogie cars, 20 watering and 6 freight cars, a total of 885. In addition, the bureau plans to acquire 60 bogie cars during the coming fiscal year. The daily average operated during July, 1923 was 82,330.66 miles. The bureau employed 1,203 drivers and 1,752 conductors at the end of July, 1923.

The following table compares the length and cost of construction of the tramways in the city of Osaka, according to report made at the end of July, 1923:—

The names of lines.	Operated milages. (miles)	Cost of Constructions. Yen
Chikko (Harbor)	2.14	620,575
East and West	2.78	1,068,624
South and West	4.40	1,408,397
Nakanoshima	2.83	1,370,924
Uehonmachi	1.81	602,429
Tanimachi	0.97	433,535
Sonezaki	2.56	1,527,349
Kitahama	1.12	787,030
Tamatsukuri	0.71	456,695
Sakai-suji	2.00	4,559,666
Utsubo-Honmachi	2.07	4,105,498
Tenjinbashi	1.62	1,809,368
Kujo-Kozu	3.72	3,581,083
West-Dotonbori to Tennoji	1.69	1,093,846
Tennoji-Ajikawa	1.08	759,998
Namba-Kizu	0.85	459,627
West Noda	0.93	607,528
Noda	0.47	369,513
West Noda-Fukushima	0.48	191,669
Matsushima-South Okajima	2.88	1,737,105
Kasumicho-Tamatsukuri	2.95	2,223,539
West Noda-Sakurajima	2.35	2,154,877
Sakuragawa-Nakanoshima	1.5	2,975,076
Umeda-Zengenjimachi	1.6	1,826,805
Ajikawa-Chikko... ..	2.13	1,246,679
Tenmabashi-Zengenjiunder construction	487,639
Tsurumachi	2.2	555,604
Northern seashore of Osaka harbor (single)	0.5	63,147
Tanikawa-Neyagawaunder construction	152,439
Uehonmachi-Shimo Ajihamamachi	do.	55,134
Tennoji-Abeno	0.4	193,275

The business result of the municipal electric railways during the fiscal year ending March, 1923 :

Income through operation of tram-cars	Y.16,248,813
Other income	1,184,923
Total	Y.17,433,736

Expenditure of operating tram-cars	Y. 8,381,760
Other expenditures	261,287
Total	Y. 8,643,048

Excess of income (profit)	Y. 8,790,688
----------------------------------	--------------

Operation of Municipal Tram-Cars. Daily Average
(April, 1922—March, 1923).

Aggregate milage	51.86 miles
No. of cars operated	253,697
Operated milage	28,116,175 miles
Number of passengers	285,632,624
Income, fares	Y.16,245,499
	Y.44,508

Sewage System

The construction of a sewage system was begun in 1894 and completed in November, 1899, covering practically all parts of the old city of Osaka. Construction in the suburban districts was commenced in 1911, and completed in 1922 at a cost of Y.6,000,000. The city planning bureau of the municipality is engaged in the construction of a sewage system in the rapidly growing suburbs of Western Noda, Ichioka, Izumio and Sangenya districts. This work was which was started in 1922, to be completed in 1924, at an estimated cost of Y.4,600,000.

The total length of the main sewage system in Osaka, at the end of 1922 fiscal year was 399,257 yards, with 100,152 yards of branch connecting to dwelling houses. The total capacity of the sewage system amounted to 49,843,258 square yards.

Osaka Harbor Program

The program for the construction of an adequate harbor for Osaka was commenced in 1897 with an appropriation of Y.18,120,000 from the imperial treasury to cover the expenditures over a period of eight years. In 1905, an additional appropriation of Y.9,200,000 was voted and the date of completion extended ten years. Because of financial conditions following the war the time has again been extended. The development of industry and commerce as a result of the war with great cargoes of merchandise and machinery entering the port of Kobe for the chief industrial centre of Japan together with the vast volume of exports from that section necessitated the utilization of Osaka's port facilities and the construction of railway spurs from the main lines to the wharves and warehouses. A plan of development was approved of and financed by the imperial government, but at the same time the Osaka municipality coming into possession of a large financial surplus as a result of prolonged prosperity decided in 1917 to expend Y.8,220,000 to complete the harbor within six years. This, like many other ambitious schemes promoted during a period of prosperity, had to be abandoned with the sharp rise in prices of labor and commodities. In 1920, the municipality passed a budget providing for Y.3,100,000 for the carrying out of work contracted for together with an additional Y.15,750,000 to complete the entire harbor program by 1926. The imperial treasury assisted in the financing by conceding an ample subsidy. In addition to the above plan, the municipality, aided by a donation from the Osaka Shosen Kaisha, constructed a passenger pier on the northern side of the harbor, which was completed in April-1922 at a cost of Y.290,000.

In December last the harbor construction bureau received permission from the department of home affairs to undertake the reclamation of 1,250 acres just outside the northern jetty of the port and to the west of the Sakurajima reclaimed area, on condition that the work be started within six months from the date of sanction. It is announced that this work will be commenced sometime in March or April. This extension to the reclaimed area has long been incorporated in the program of the harbor construction board which plans to complete the job within five years at a cost of Y.4,000,000. When completed, it will create a basin between the new and the old Sakurajima reclaimed areas and will be crossed by several canals. The ground will be used for the erection of warehouses, factories and offices in addition to providing a spacious storage yard for the harbor construction board. To expedite this work, a canal 60 yards wide will be cut through the northern jetty in order to provide passage for mud scows and dirt barges.

Apart from this municipal scheme there is also a private project to dig a canal to connect the Shorengi-gawa with the harbor and which a permit has been applied for. A dockyard and quay on the northern side of the harbor is also being constructed under contract by the Sumitomo firm at a cost of Y.3,100,000. The following table gives some figures of the present Osaka port facilities:—

Water area	1,807.5 acres (2,169,000 <i>tsubo</i>)
Depth of water	28-ft. and upward.
Reclaimed land	1,055.6 acres (1,266,675 <i>tsubo</i>)
Main pier	489.6 yds. long, 29.7 yds. wide.
T shape pier	35.6 " 5.9 "
Sakurajima iron pier	79.2 " 11.8 "
Sakurajima iron pier	138.6 " 11.8 "
Sakurajima wharfage	203.9 " 8 "
Tempozan pier	136.6 " 9.9 "
Watashi pier	15.9 " 7.9 "

Canals:—

Canal through reclaimed land, aggregate length 7,920 yds. The shallowest depth at low tide is 7-ft.	
Tempozan canal (connecting Aji-gawa and Shirinashi-gawa); 2,289 yds. long and 49 yds. long.	
Branch canal of Tempozan, (connecting Tempozan canal and inner port of Osaka); 408 yds. long and 79.2 yds. long.	
Fukumachi moat	1,148.4 yds. long, 39.6 yds. wide.
Kitsu-gawa canal	1,996 " 87.2 yds. "
Chitose canal	2,079 " 59.4 yds. "

Warehouses and customs sheds:

Warehouses: municipal, 5,374.7 sq. yds. 2 houses. Private, 87,374 sq. yds. 90 houses.	
Customs sheds: Municipal, 33,454 sq. yds. 14 houses. Private, 62,732 sq. yds. 38 houses.	

Roads and Streets

Street maintenance and construction in the city of Osaka is supervised by the municipality, outside the city, limits by the

prefectural authorities. According to a report made in June, 1923, the area and length of the streets under the administration of the municipal public works bureau was as follows:

STREETS WITHIN THE CITY OF OSAKA

Kinds	Area. (In sq. yards.)	Length. (In yards.)
National streets ...	43,266.6	5,900
Prefectural streets ...	38,988	5,385.5
Municipal streets ...	3,710,893	
Length of the municipal streets with width of 1.98 yards and upward ...		607,028.5
Width under 1.98 yards...		48,557.6

The total length of streets within the city of Osaka, was 667,871.6 yards with a total area of 3,793,147.6 square yards. With the streets belonging to the harbor office, and those used for railway construction the total area amounts to 5,070,000 square yards.

The municipality proposes to spend approximately Y.2,500,000 during 1924 for the construction of new and the rebuilding of old streets, and although complete plans for new street building have not yet been approved by the higher authorities work will proceed in accordance with plans already passed upon.

The municipal government has sent delegate to Tokyo to obtain the approval of the imperial authorities for the floating of a bonds to the value of Y.5,000,000 the proceeds to be used for city improvement. Chief Okazaki of the municipal general affairs bureau, believes that the city will be able to spend this year some Y.27,000,000 for public works, including the construction of roads.

The following is the list of street improvements that remain to be completed:—

1. The Mido-suji (In 1924 that section between Yodobashi and Honmachi-suji will be completed.)
2. Kujo-Umeda (From Higo-bashi to Kujo.)
3. North-South street (From Higobashi to Minato-machi.)
4. Jonan (from 3-chome, Tani-machi to Morinomiya.)
5. From Daikoku-machi to Kansai (all.)
6. East-West street (Uehom-machi to 6-chome, Tani-machi.)
7. Osaka street (From Matsuya-cho to Tennoji.)
8. Umeda-Tenma (From Umeda to Ogibashi, past old prison.)
9. Tamatsukuri to Noe (all.)
10. Sakura-no-miya (all.)
11. From Edobori to Joso (From Edobori to Tokaido-suji.)
12. From Kujo to Honda (all.)

Of these projects, several are expected to be completed by the end of this year.

The Osaka prefectural government has drawn a draft plan for constructing broad inter-urban streets, radiating from the city with a program to complete them during 11 years, beginning 1924, at an estimated cost of Y.39,786,555. The following table compares the year and its individual percentage of completion:—

Years:	Percentages.	Years:	Percentages.
1924...	0.001	1930...	0.112
1925...	0.064	1931...	0.103
1926...	0.090	1932...	0.113
1927...	0.097	1933...	0.127
1928...	0.105	1934...	0.071
1929...	0.113		

Parks and Playgrounds

There are about 14 parks and public playgrounds in the city of Osaka, with an aggregate area of 33.6 acres, costing about Y.456,700. The names are as follows:

Names.	Location.
1. Municipal playground.	Yawataya-machi, Nishiku.
2. Yodogawa park.	Kawasaki-machi, Nakano, Kita-ku.
3. Nakanoshima park.	Nakanoshima, Higashi-ku.
4. Ten-noji park.	Tennoji.
5. Okura-ato small park.	Okuramachiato, Minami-ku.
6. Shimizudani small park.	Shimizudani, Higashi-ku.
7. Kitano small park.	Kitano, Kita-ku.
8. Noda small park.	Nishi-Noda-machi, Kita-ku.
9. Awaza small park.	Awaza, Nishiku.
10. Kujo small park.	Minami-dori, Kujo, Nishi-ku.
11. Nishi-Kujo small park.	Nishi-Kujo, Nishi-ku.
12. Kizu small park.	Kizu, Minami-ku.
13. Chikko garden.	Shijo-dori, Nishi-ku.
14. Ohgimachi, park.	Ohgi-machi, Kita-ku.

	Area (in tsubo) (One tsubo equals 3.95 sq. yds.)	Cost of Construction. (In yen.)	Equipment.
1.	12,000	40,000	General sport equipment.
2.	5,000	20,000	Swimming pool.
3.	6,500	30,000	Tennis court, etc.
4.	5,000	20,000	General equipment.
5.	418	28,738	"
6.	801	34,575	"
7.	419	28,389	"
8.	378	28,450	"
9.	519	45,327	"
10.	1,006	73,660	"
11.	2,061	75,019	"
12.	704	11,289	Track field.
13.	5,000	6,318	General equipment.
14.	490	15,000	General equipment.

The necessity of creating large parks having been driven home by the recent disaster in Tokyo, the city planning bureau is now studying a plan to create a system of parks, the extension of which will ultimately total 3,500,000 tsubo, or 2,916.6 acres. The outline of the plan as reported is as follows:

1. *Yodogawa Park.*—The Yodogawa river banks will be converted into the Yodogawa park, extending from Hirata, the northern end of Moriguchi, to Dempo, including Morikoji, Honjo, Akagawa, Kema, Kitanagawa, Toyosaki, Sagisu on the left, and from Kita-Omichi down to Fukumura, including Toyosato, Nishinakajima, Kunishima, Joso, Hiyejima on the right.
2. *Sone Park.*—At the eastern part of Sone along the river.
3. *Senriyama Park.*—On the plateau of Senriyama, in the northern part of Suita.
4. *Aigawa Park.*—Along the river of the same name south of Suita.
5. *Nevagawa Park.*—Along Neya river including towns and villages from Tokuan to Imafuku.
6. *Tanabe Park.*—At Tanabe around Monoyama Middle School.
7. *Yamatogawa Park.*—Along the Yamato river to the north of Sakai city.
8. A chain park in South Osaka, including Ten-noji, Shoten Hill, Abeno, Tezuka Hill, Sumiyoshi Shrine.

Investigations as to the cost of this plan are making headway. Osaka plans to construct a road connecting all these foregoing parks from Mino-o park, Hamadera park, touching Nishishoji, Nobatake, Juso Bridge, Ten-noji, Sumiyoshi, at a cost of Y.80,000,000. This plan is still in the air owing to lack of finances. The prefectural government, however, has started to re-model Hamadera park as an initial step.

Americans Obtain Amur Gold Rights

Prospecting rights in approximately 3,500 square miles of placer gold fields in the Amur basin have been conceded to the Far East Exploration Company headed by Henry T. Hunt of Cincinnati, says a Moscow dispatch. The concession was obtained by Charles H. Smith, former American member of the Chinese Eastern Railway commission. Mr. Smith is now in Moscow.

The company expects to begin work in the spring, but its rights are available until January 1, 1925, after which date it must make a final contract, meanwhile paying from 5 to 8 per cent. royalties in addition to an acreage charge. The fields were last worked in 1915.

* * *

Big Fire Fighting Engines for Tokyo

Five fire engines made by the Allen Fox, the Staat, and the Le France Companies in the United States have been delivered to the fire brigade headquarters of the Tokyo metropolitan police board. They were ordered to replace in part the 13 Tokyo fire engines destroyed in the earthquake.

The newly arrived engines can each throw 750 gallons of water a minute, and are of 75 horse power each. Other fire engines able to throw more than 1,000 gallons a minute will arrive from America within January on February.

Electrical Developments in Manchuria

ENTERPRISE OF THE S.M.R.

The Yalu River Hydro-Electric Power Project

WHAT promises to develop into one of the most important electrical enterprises of Asia is now being investigated by the experts of the South Manchuria Railway Company. About 100 miles above Antung near Igen in Korea the Yalu River is full of rapids that will give 35,000 horse-power during the summer

season and at least 10,000 horse-power when the river is ice-bound. No dams are necessary for the accomplishment of this undertaking, while the rock required for tunnels and canals is found close at hand and easily worked. Eight kilometres below this site there is another rapid capable of furnishing another 20,000 horse-power. The railway company is encouraged in carrying out the scheme by the success of the Seoul Electricity Works in bringing power from the Diamond Mountains, a distance of 102 miles.

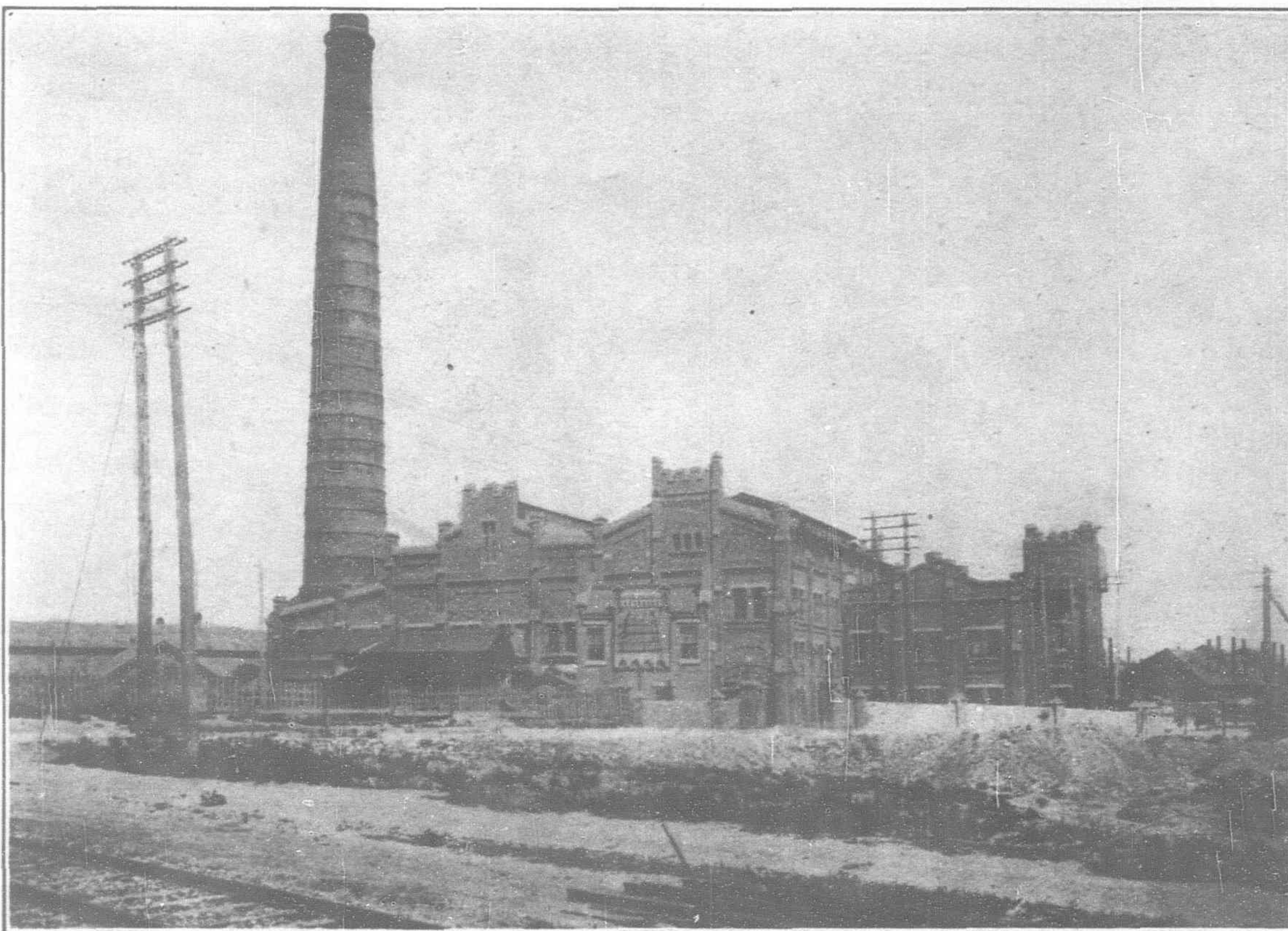
The Korean government has also established a special office for developing the hydro-electric resources of the peninsula, and its investigations indicate that out of an estimated available total of 1,000,000 horse-power, the Yalu River with its tributaries is capable of supplying two-thirds, or about 700,000 horse-power. The scheme has naturally created considerable discussion in Japanese engineering circles. Its success will hinge upon the ultimate cost of power to the consumer. The distance from the site of the proposed power house to Antung being 120 miles, the cost of erecting transmission towers and lines and

transformer stations will materially increase construction costs and compel a high charge for current. In Japan the cost stands between 3 to 5 sen per kilowatt for power and about ten sen for lighting. The maximum distance which power can be transmitted at a profit is placed at 200 miles, so there is no reason why the Yalu proposition could not be made to pay. Mukden is only 160

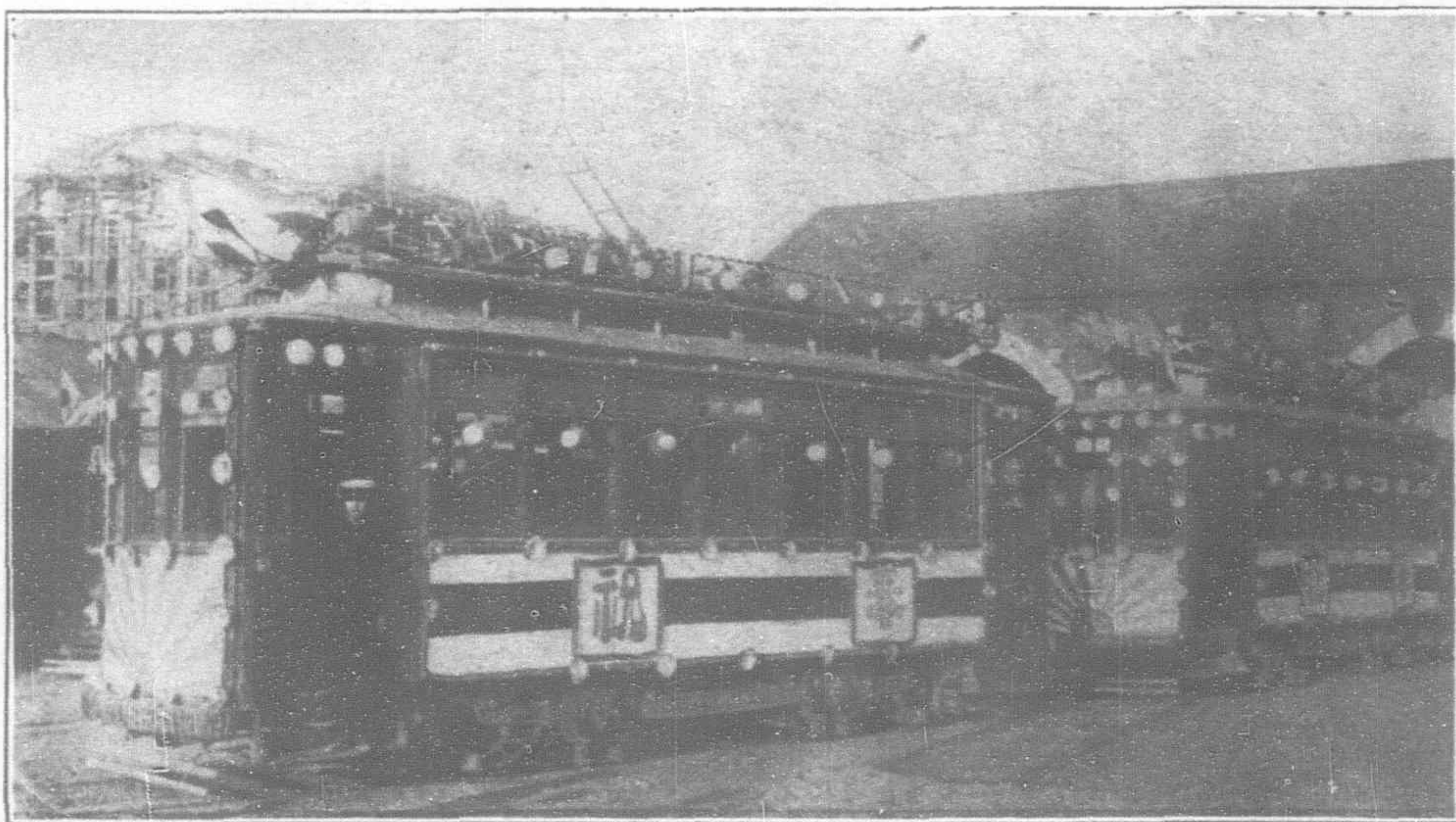
miles in a straight line from the site of the proposed power plant and all other important industrial centres of South Manchuria are within transmission distance. However, in these regions all electrical generating stations are operated by steam obtaining their fuel from the almost inexhaustible coal mines of Fushun. A fuel famine in Manchuria is a remote possibility. On the other hand, Japanese engineers say that the coal reserves of Japan are

dwindling and will be exhausted in another century. Wherever possible, all enterprises in Japan should be operated with electric power so as to save the home coal supply. As there are specific industries which must always rely upon coal for generating power, the Fushun mines will be more and more called upon to meet the future demands of Japan and any plan which will help to preserve this reserve for the use of Japan should be encouraged.

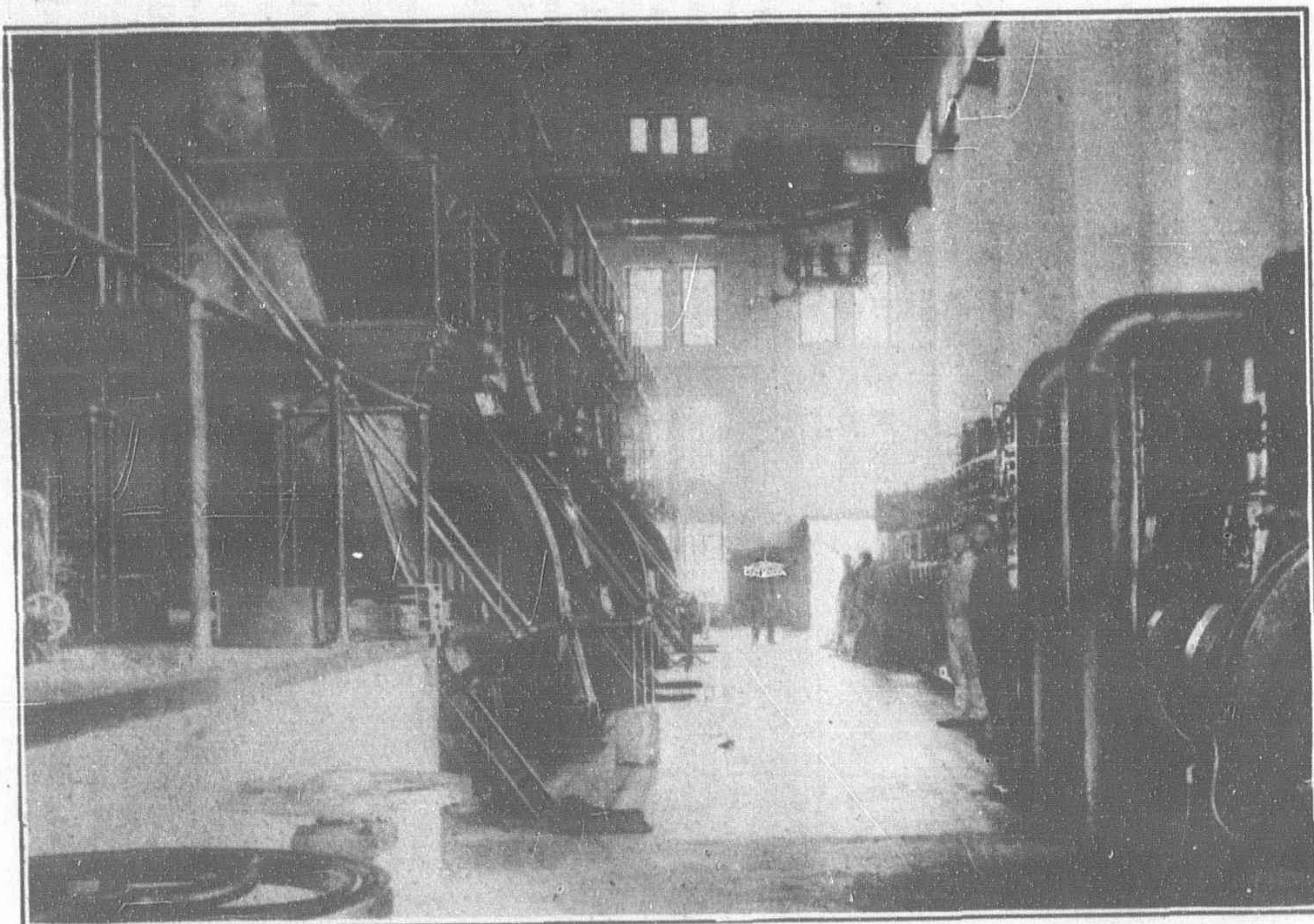
The initial success of the Yalu power scheme must depend largely upon the development of Antung as a manufacturing centre. At present only about 2,000 kilowatts are consumed at this port, but it is hoped that by sup-



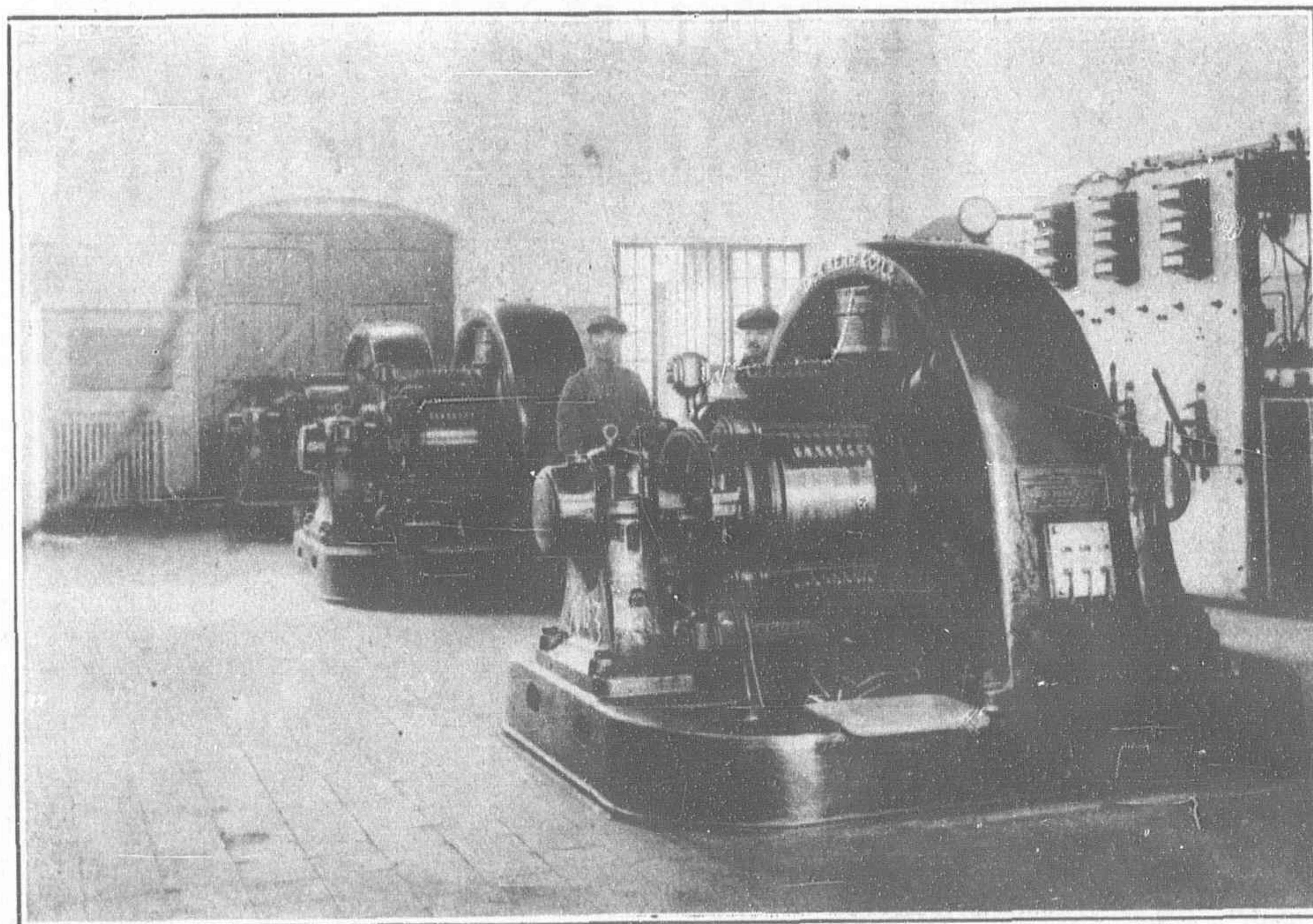
Main Power House of the S.M.R. Electricity Department at Dairen.



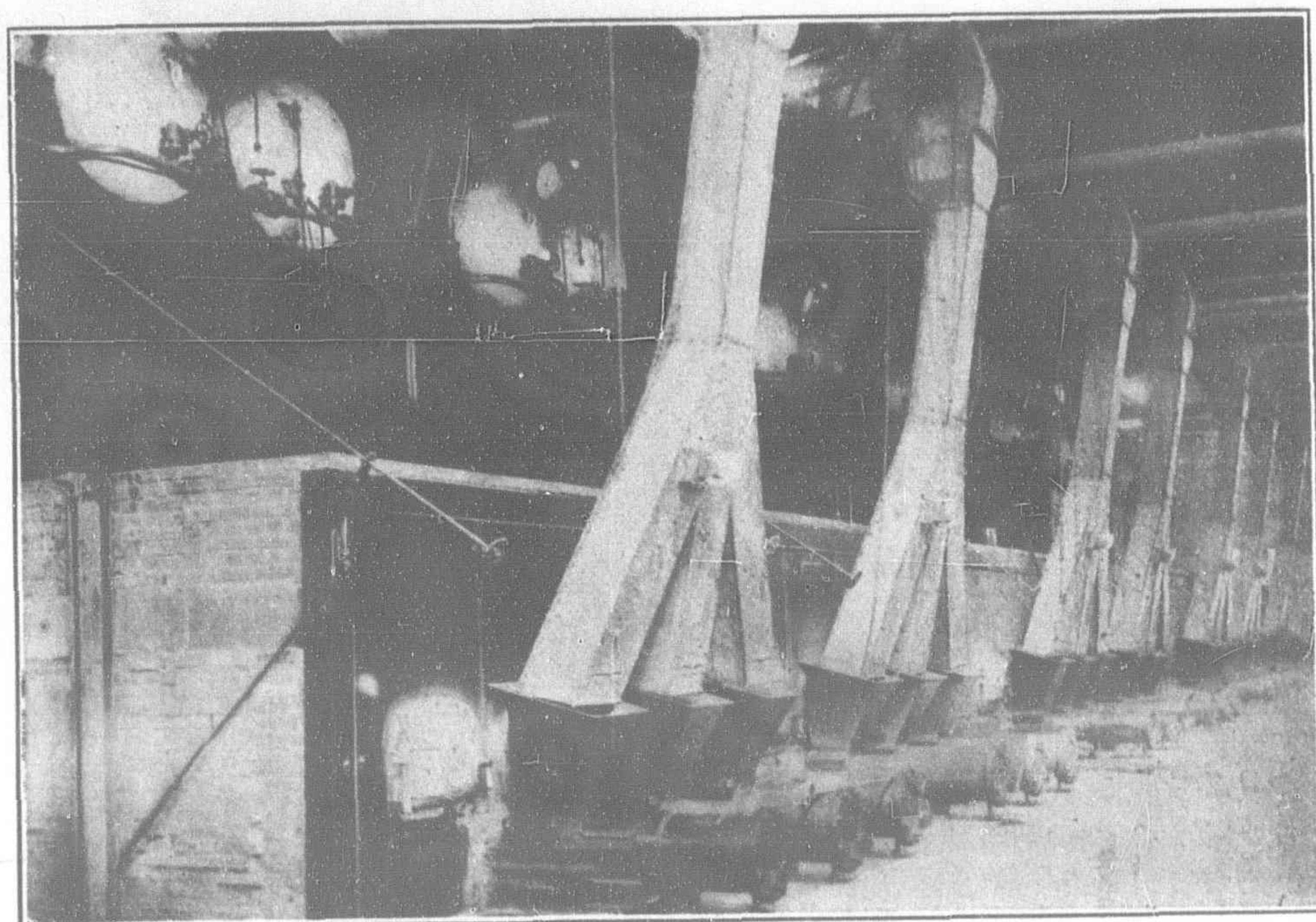
Dairen Tramcar Decorated for Festival Day.



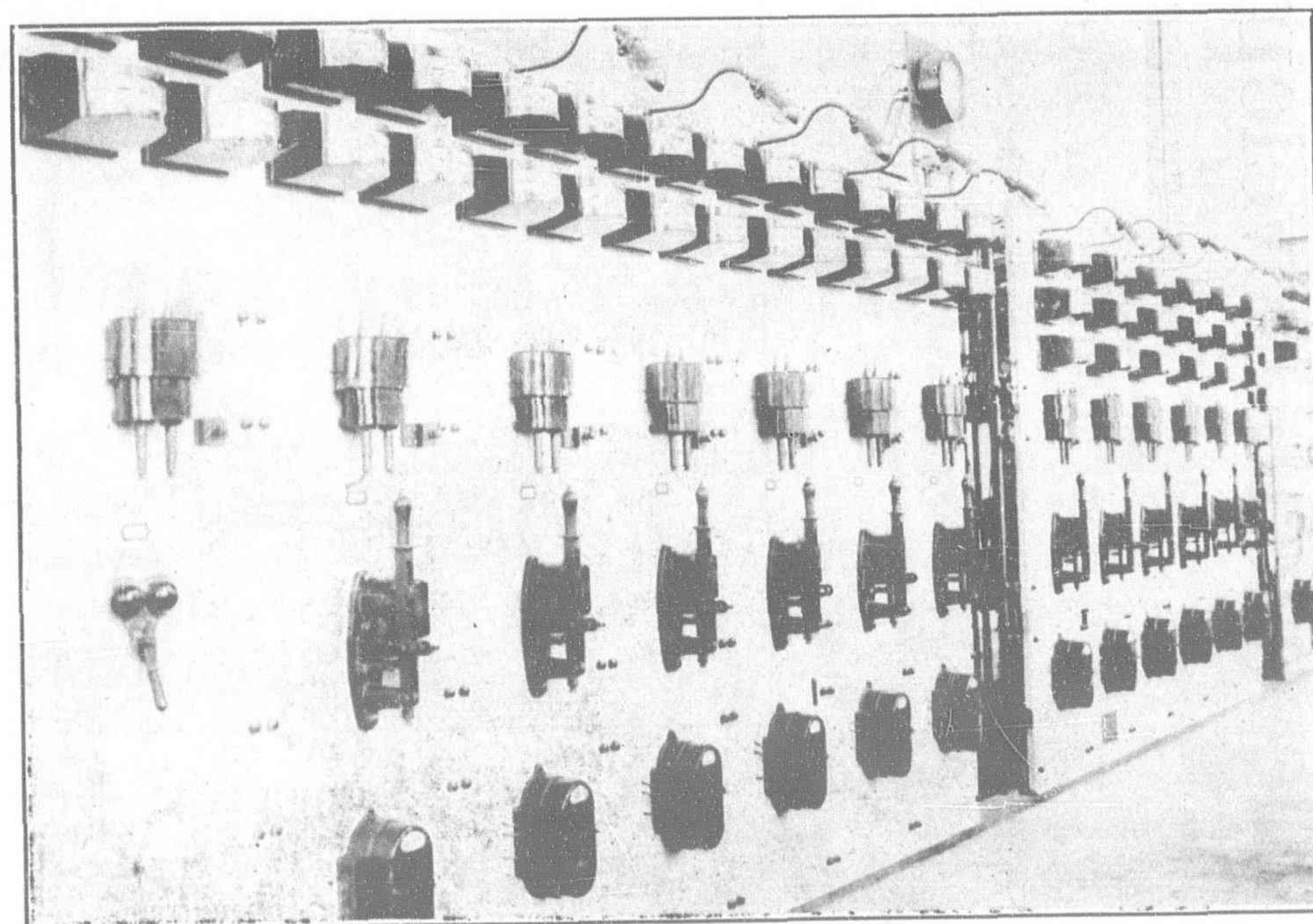
Generator Room, Hamacho Power Station, Dairen: 3 sets, 1,000 kva, 2,300 volts and 2 sets, 1,875 kva, 2,300 volts.



Rotary Converter Room, Hamacho Power Station, Dairen: 3 sets, 400 kw., 550 volts.



Boiler Room, Hamacho Power Station.



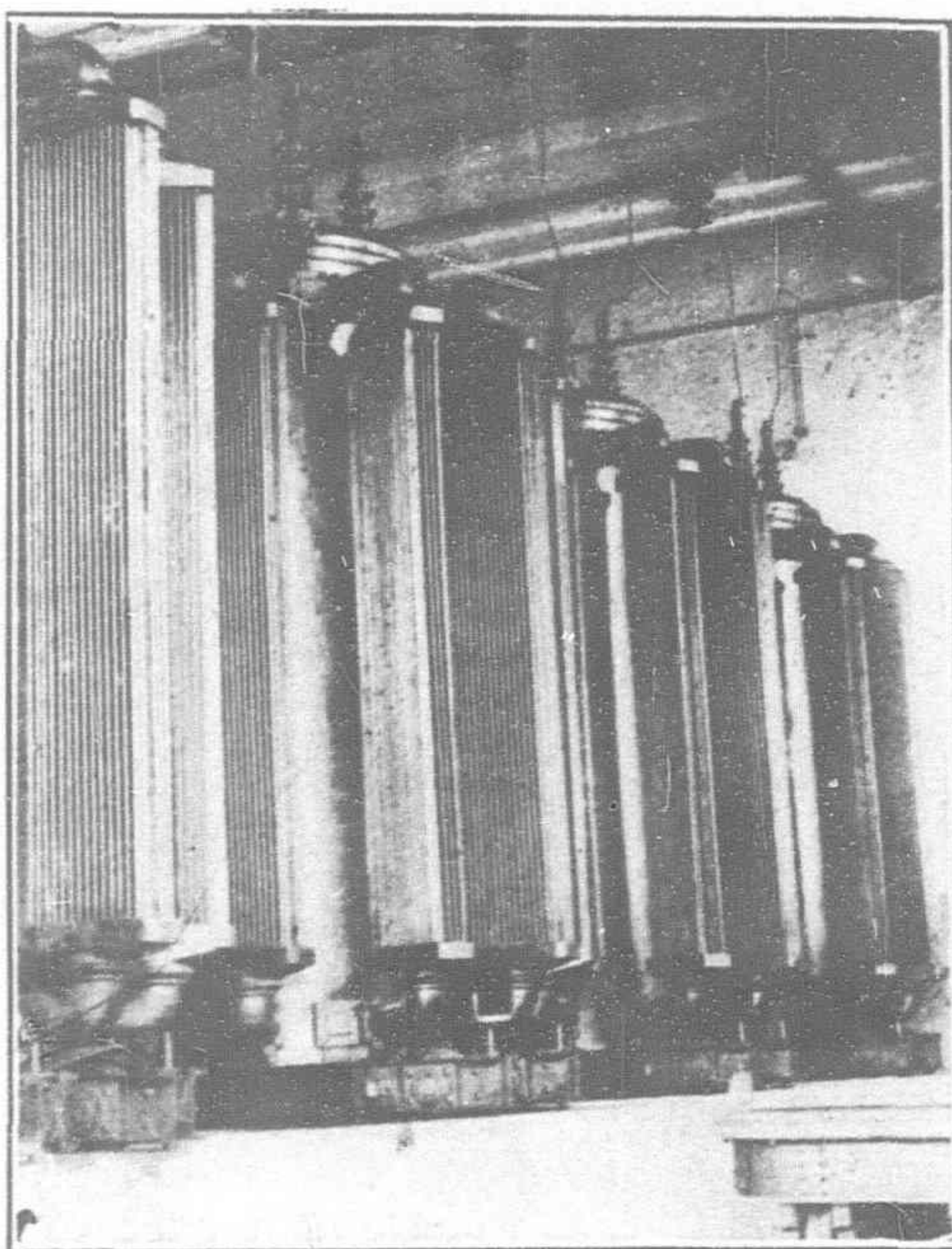
Switchboard, Nagatomachi Sub-Station, Dairen.

plying current at a sufficiently low rate, foundries and other industrial establishments now idle will be galvanized into activity. The electrification of these established industries alone will call for about 10,000 kilowatts. Mines which are now closed down will also re-open with greater prospects of prosperity.

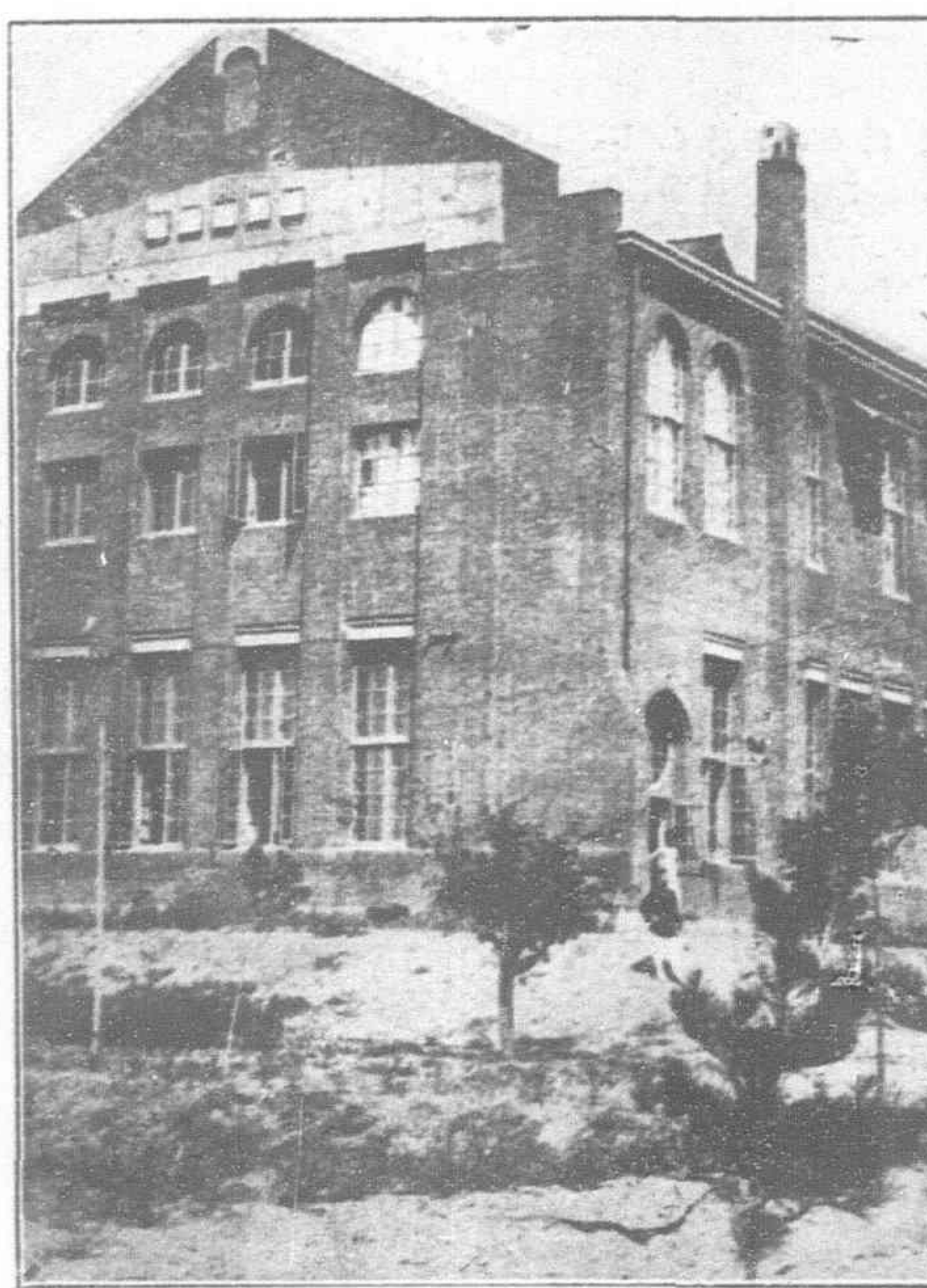
Another obstacle confronting the Japanese in carrying out this scheme is the fact that some of the most desirable power sites are on the Chinese side of the Yalu and all transmission lines into Manchuria will have to cross Chinese territory. However, a start can be made with power stations on the Japanese side of the Yalu to furnish power to Antung and develop that port into an important industrial centre. There are also sufficient sites on the Korean side of the river to provide power for industrial purposes within territory under Japanese jurisdiction. There is an ample field for its consumption in the rapidly growing industrial city of Ping-yang.

Electric Bulb Factory Projected

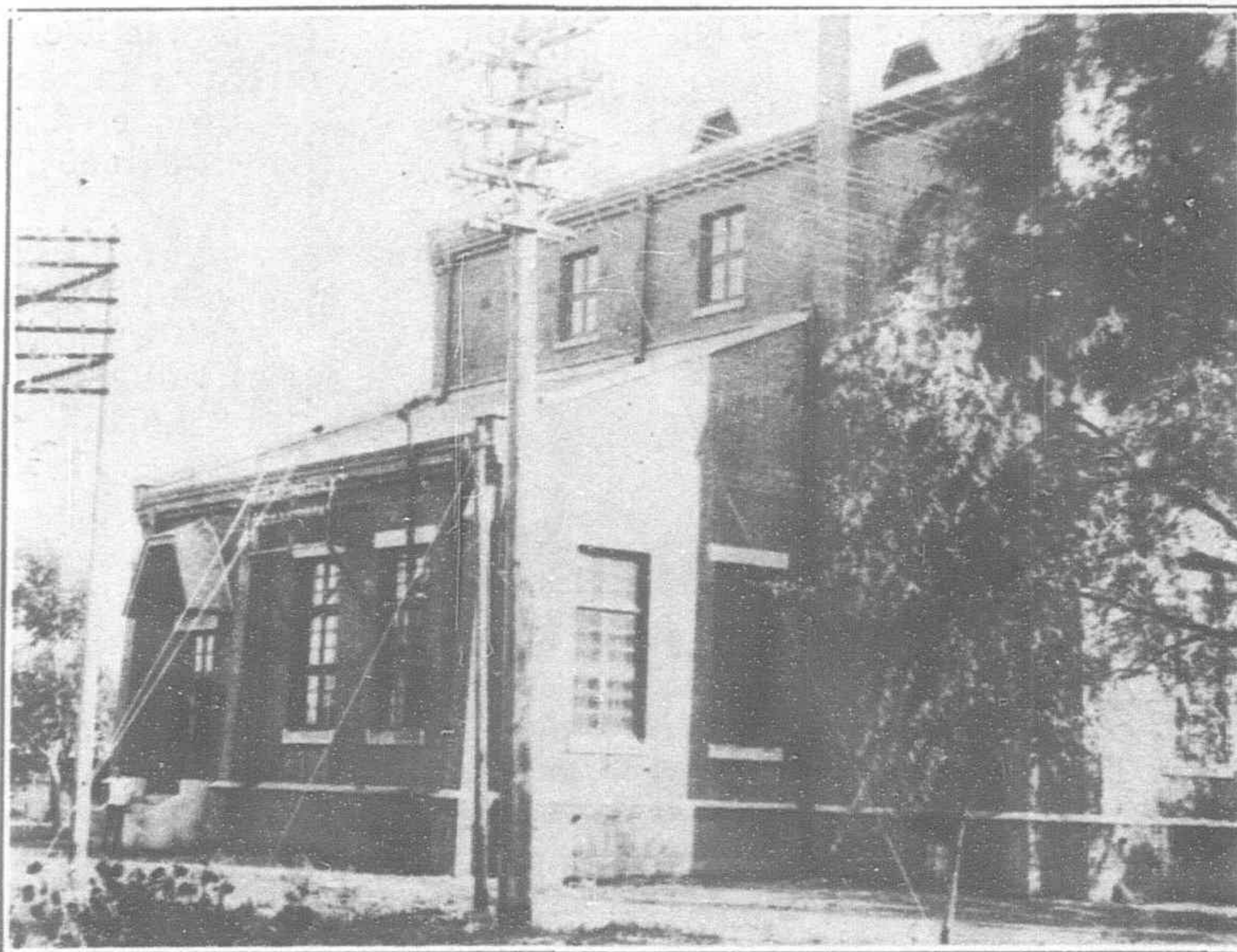
Considerable interest is being displayed in Dairen over the manufacture of electric light bulbs in that city. The electric repair shops of the



Transformer Room, Sub-Station, at Fushun:
4 sets 1,000 kva, 44,000 volts



Fushun Sub-Station, Outside View

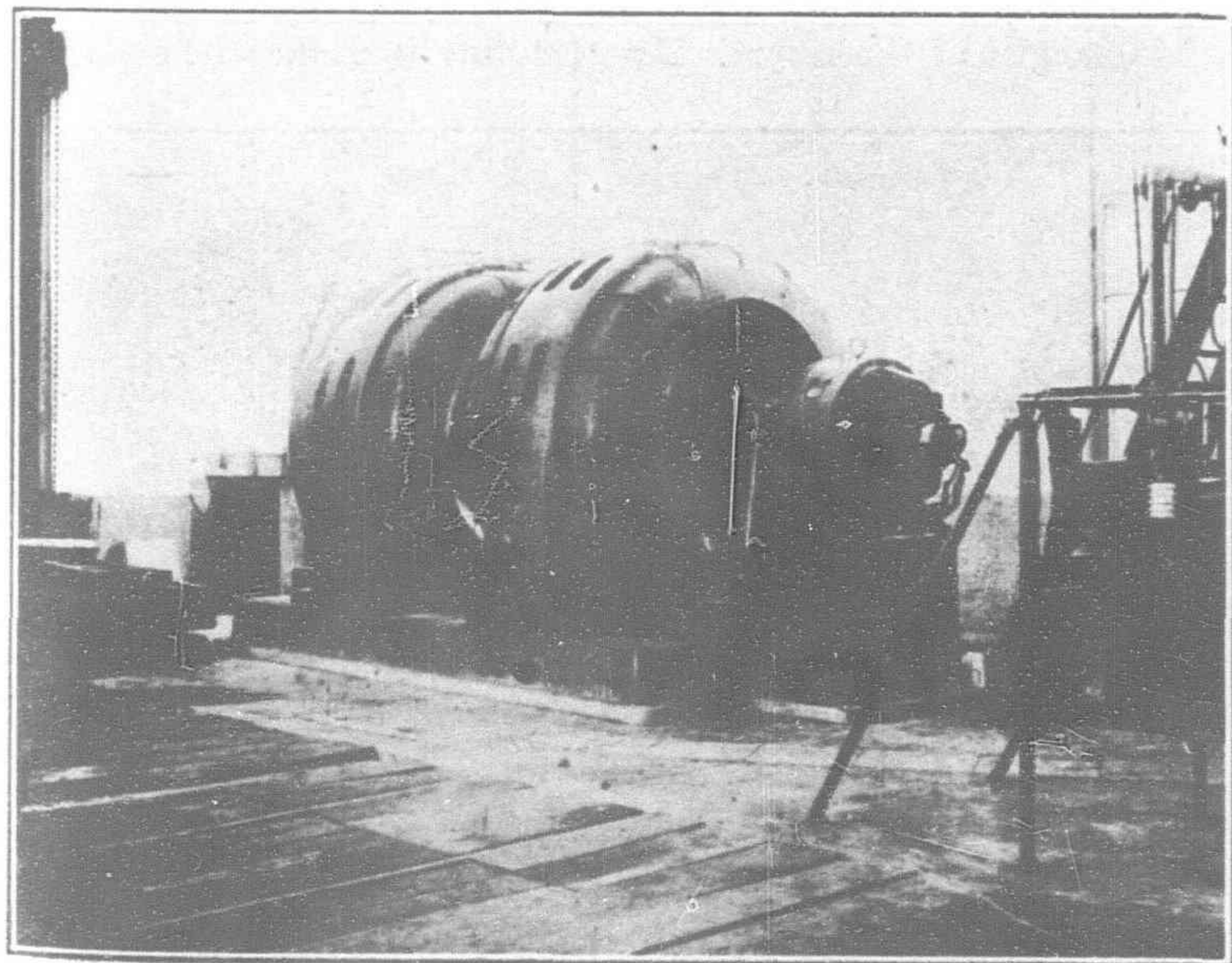


Mukden Sub-Station

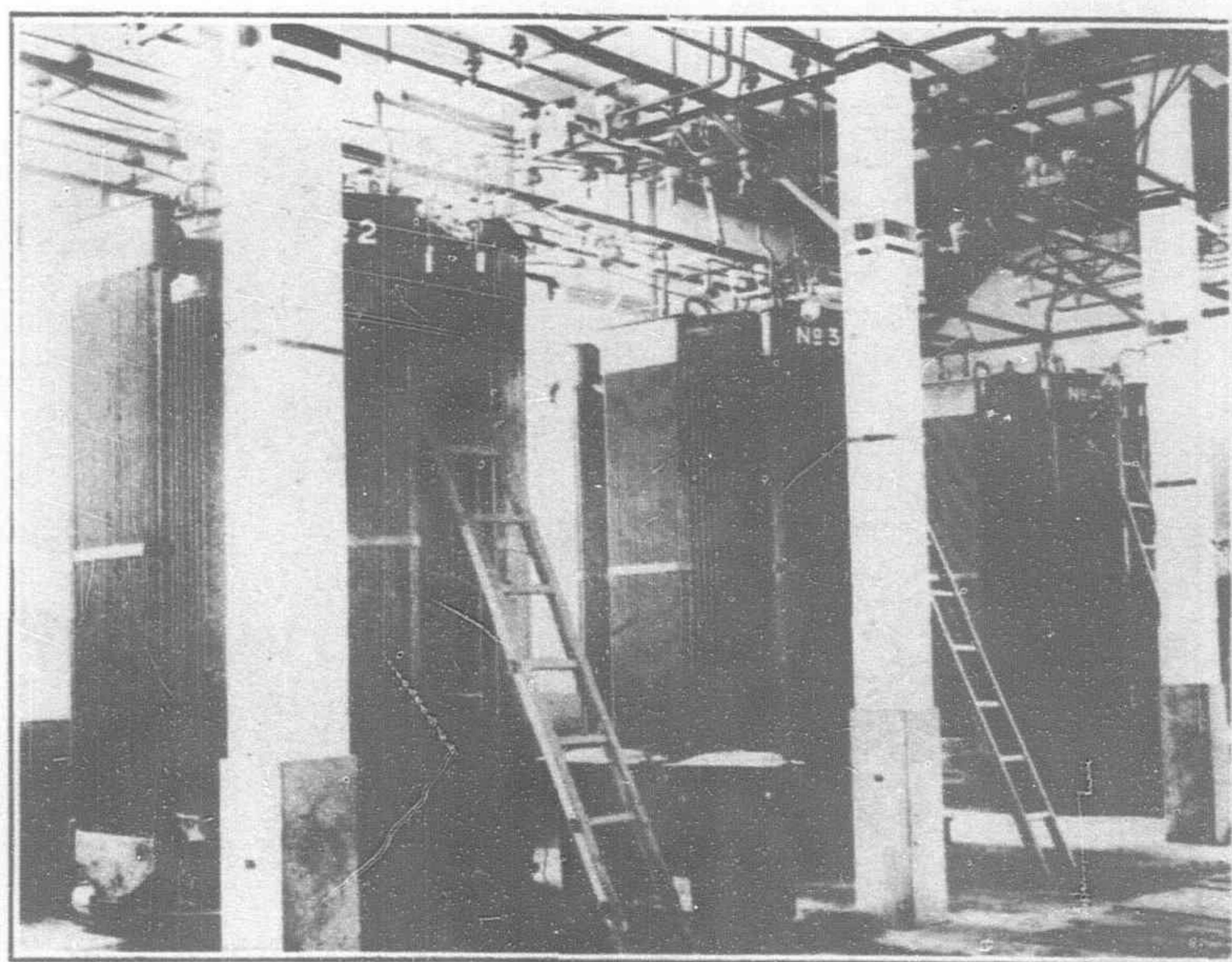
South Manchuria Railway attached to the Shahoku Works operates its own bulb factory turning out about 150,000 lamps per year. The supply of bulbs hitherto has been almost monopolized by the Tokyo Electric Company whose production cost is said to be about 11 sen per bulb, while the special price to the S. M. R. is 30 sen and the ruling price in Chosen, 40 sen per bulb. The S. M. R. and its allied enterprises consume about 800,000 bulbs per year. The damage to the plant of the Tokyo Electric Company at the time of the earthquake led some of the smaller Japanese companies to submit a proposition to the S. M. R. to take over its plant, enlarge it and enter actively into competition for the supply of bulbs for the China and Korean markets. With the requirements of the S. M. R. as a basis, they argue that a large and profitable industry could be established. It is said that the S. M. R. is willing to consider the proposition and if investigations now being made are favorable the present bulb factory will be enlarged and launched as an independent company.

Activity of the S.M.R.

The S. M. R. is extremely active in developing its electrical properties. At Newchwang, a



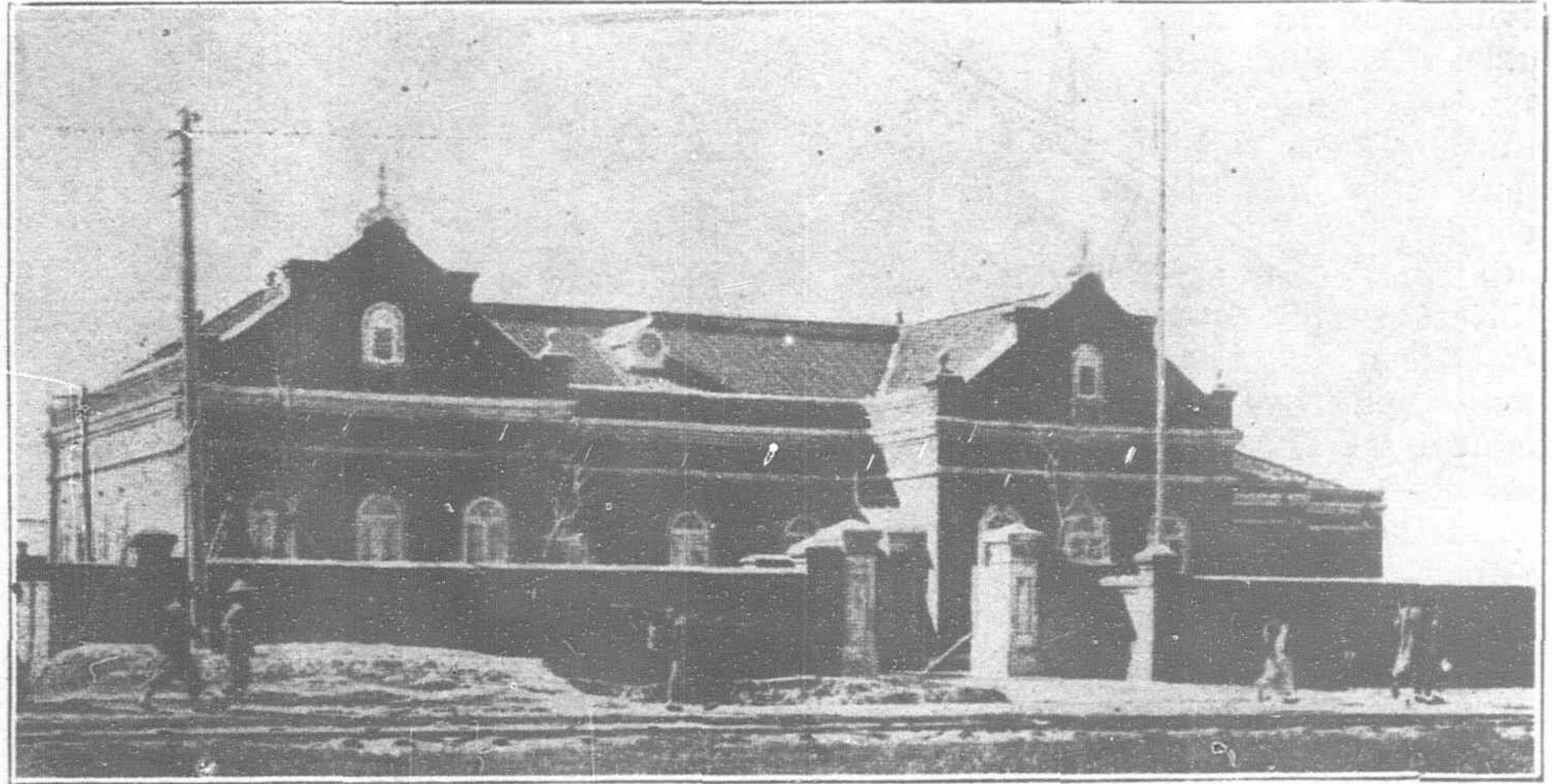
Frequency Changer Room, Nagatomachi Sub-Station, Dairen: 1 set,
2,500 kva, 25-50 cycles, 2,300-11,000 volts



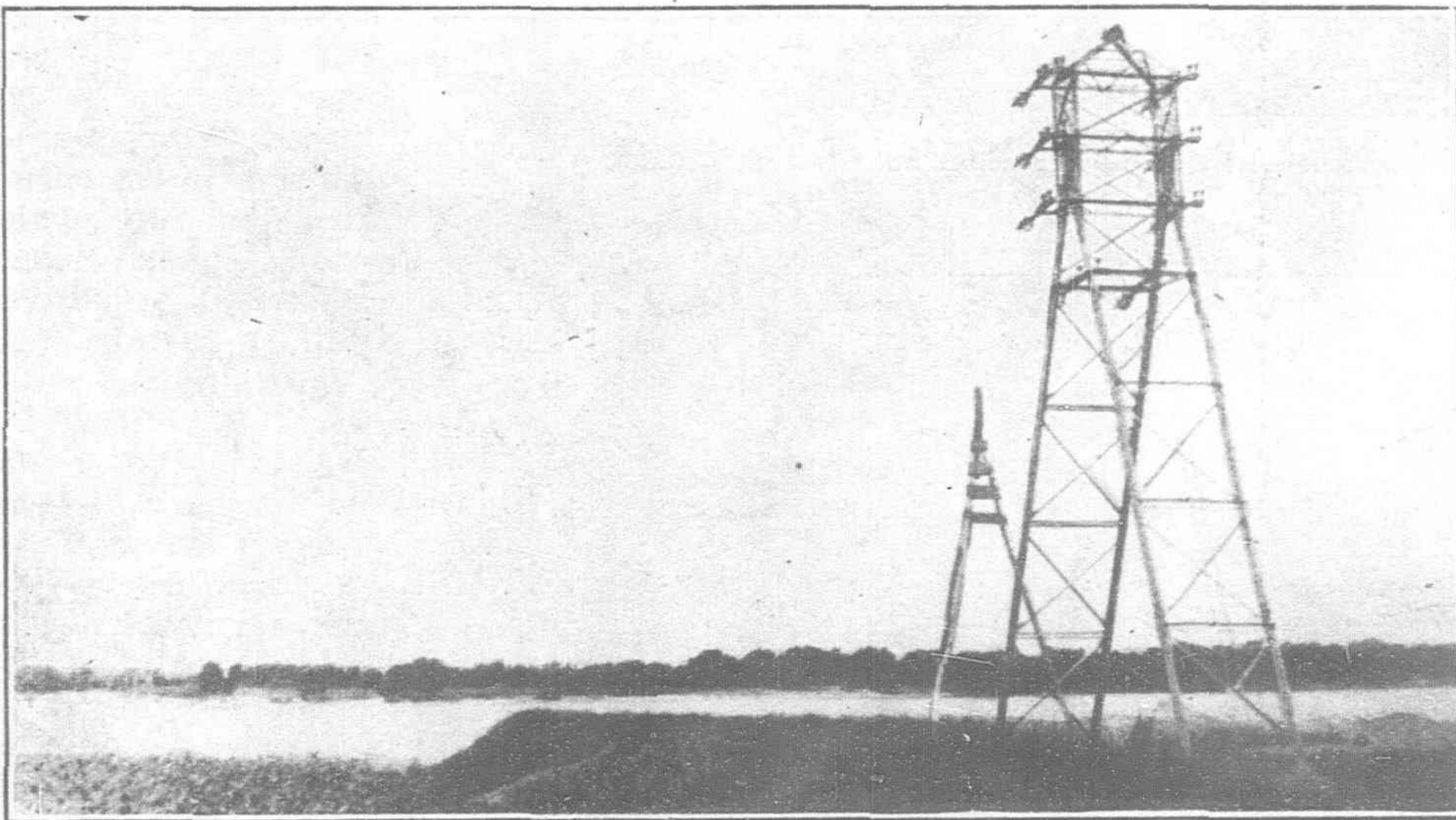
Transformer Room, Nagatomachi Sub-Station, Dairen: 4 sets, 2,000
kva, 11,000 volts

new 1,000 kilowatt set is being added to the plant of the Yinkou Waterworks and Electric Company in order to meet the growing demand for current. Liaoyang is to be supplied from Fushun through a 1,500 k.w. transformer station now nearing completion. Mr. Izuhara, the chief of the electricity department of the S. M. R. says that the power supply will be opened early next May. According to the present plan, 1,000 kilowatts will be used by the new Manchuria Spinning Mill, Ltd., and the remaining 500 for the inhabitants. The supply will be raised ultimately to 3,000 kilowatts.

At Antung, saw milling work is in active progress as an effect of the earthquake in Japan. The power-house can generate 3,000 kilowatts, of which 2,000 kilowatts are being distributed. Paper milling work promises to be revived, in which event the whole of the supply will have to be served.



Power House of the Yinkou Hydro-Electric Company, Newchwang



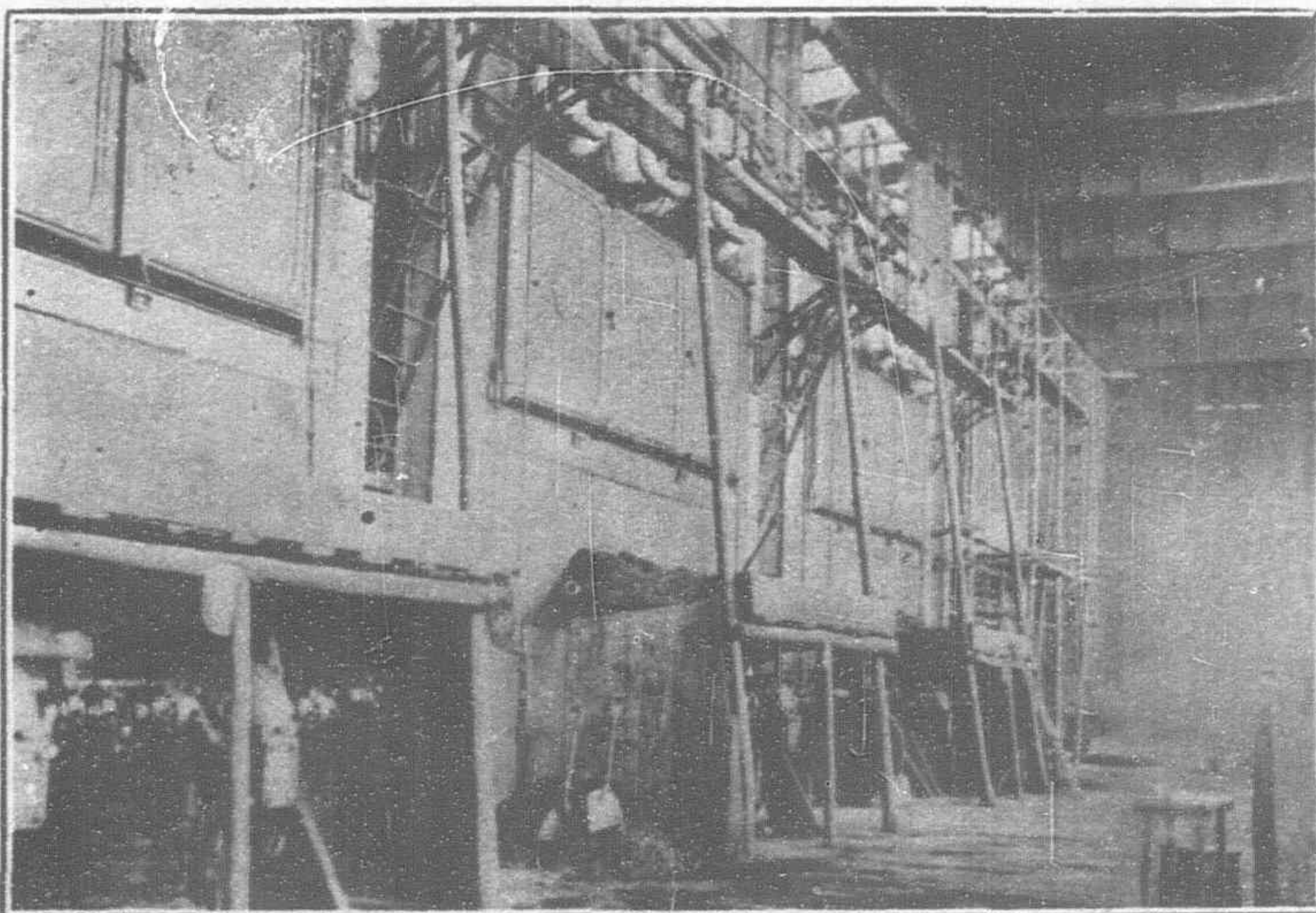
Transmission Line from the Fushun Power House to Mukden: River Crossing

The electricity department of the South Manchuria Railway Company under the directorship of Mr. T. Idzuhara, controls most of the electric light and power business within the railway zone, maintaining plants at Dairen, Mukden, Changchun, Antung, Port Arthur, Newchwang, Liaoyang, Tieling, Wafangtien, Tashihchiao, Kaiyuan, Kiatow, Ssupingkai and Kungchulin. The capital value of the main properties in the last annual report of the S.M.R. is given as Y.10,303,118.

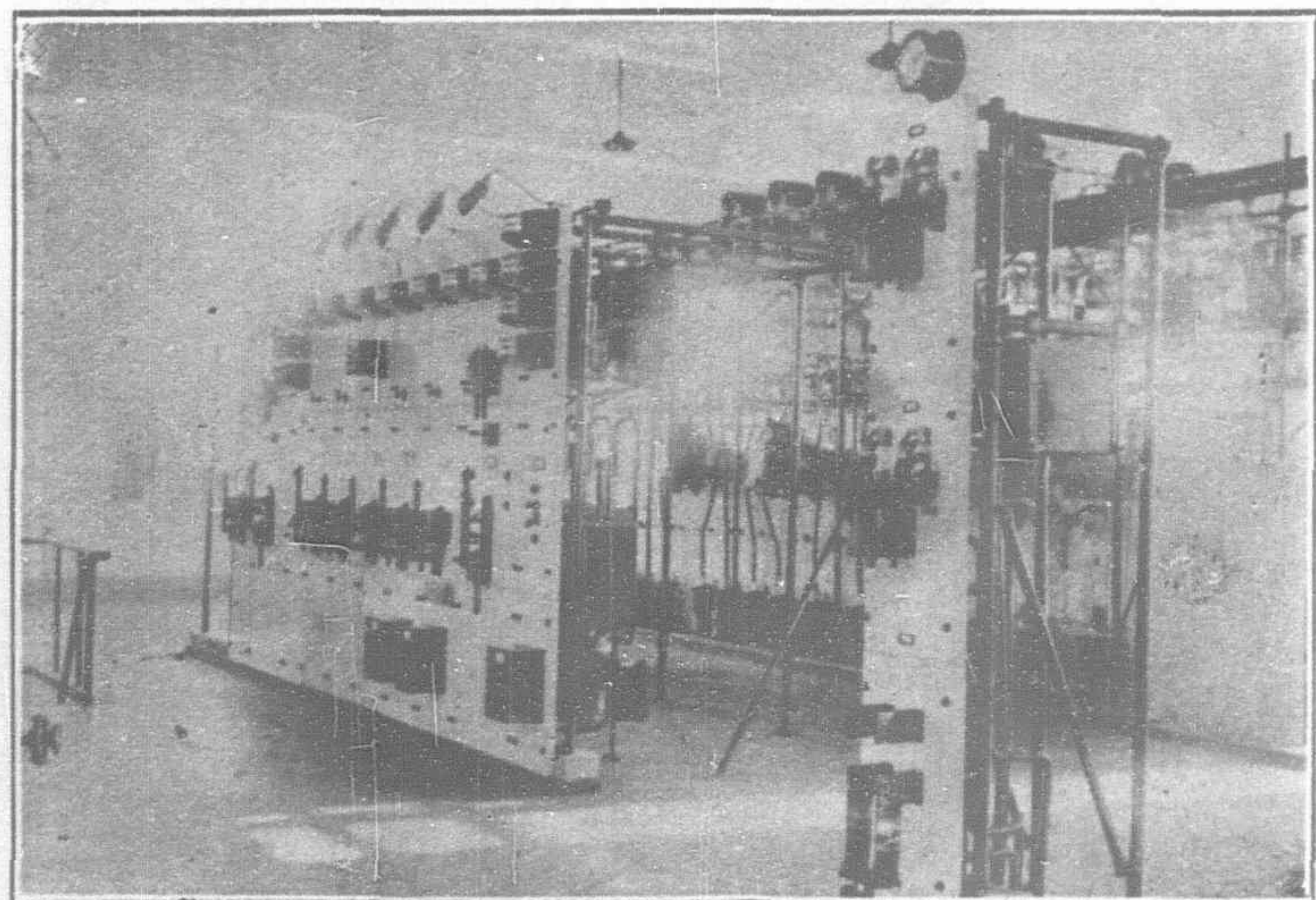
Dairen.—The principal plant operated by the S.M.R. is the one at Dairen, known as the Hamacho power house. This was

originally erected by the Russians at a point near the railway shops and harbor and when taken over by the Company from the Japanese government, was an ill-appointed installation. Public lighting and power for industrial purposes was commenced in October, 1907. As the demand still exceeded the supply, it was decided to increase the power to 3,000 k.w., in the second half of 1908 and the work completed in 1911. As the supply was found still inadequate to meet the demand, another generator of 1,500 k.w. was installed in 1912, and a further addition was made in October, 1917, of three step-up transformers of 350 kilowatts ampere. At the end of March, 1922, the number of electric lights supplied at Dairen was 402,976 (converted to the basis of 10 candle-power), in 23,489 houses, and the electric power was 7,464,587 horse-power. The company also established an electric tramway system in the streets of Dairen to an aggregate length of 13 miles, the larger portion of which was completed and has been in use since August, 1909.

Tramway—The erection of large railway workshops at Shaho-kou and of a sea-side hotel and bungalows at Hoshigaura (Star Beach), one of the finest sea-side resorts in North China, rendered it necessary to lay a five-mile suburban line, which connects with the city lines. This suburban line was commenced on January 1, 1911, the single return fare for the whole route being 10 sen (2½d.) and 8 sen (2d.) for special and ordinary classes respectively. The terminus of this suburban tramway was shifted to the western fringe of the popular summer resort in 1918, extending it through the whole length of the resort. Another line to Rokotan, a sea-side



Boiler Room: 4 B. & W. Water Tube Boilers Equipped with Westinghouse Stokers



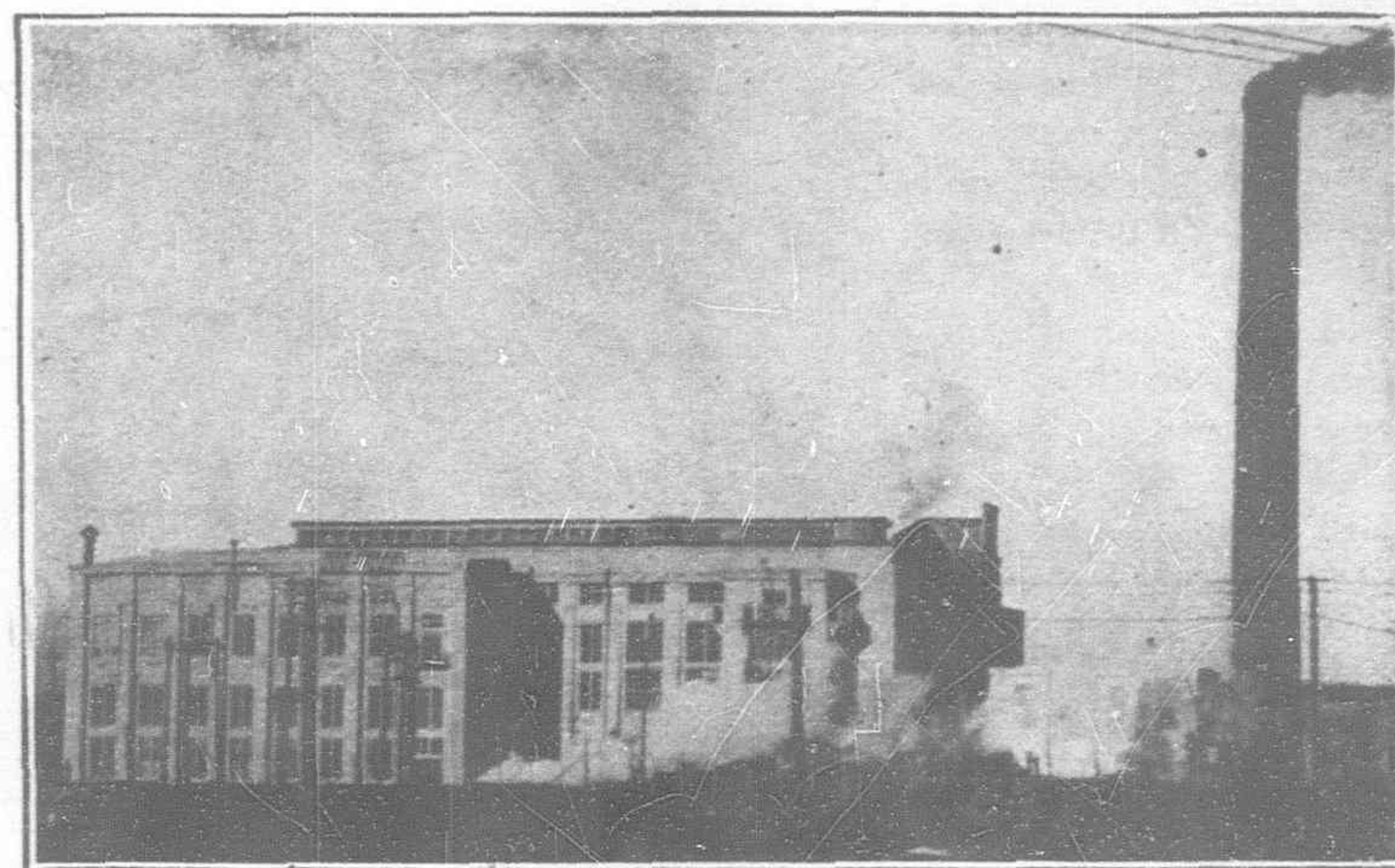
Switchboard: All G. E. type appliances made by the Shibaura Engineering Works

THE AMANOGAWA POWER PLANT AT DAIREN

resort, three miles from the terminus of the city line, was opened for traffic on August 1, 1911. The conveyance of bean and beancake by electric tramway is operated between Hsiaokangtzu (the Chinese quarter) and the wharf, a distance of about 2½ miles. The running mileage at the end of 1921 was increased to altogether over 31 miles, and the numbers of cars now in use are 65 passenger cars, 10 goods cars, and one water sprinkling car.

The remarkable decrease in the amount of outlay of Dairen during the fiscal year 1916 was due to the fact that the electric work shops were transferred to the management of the Shahokou Work-shops in July, 1916.

Working year.		Kilowatts generated.	Receipts in yen.	Outlay in yen.
1918	..	17,098,532	1,423,864	859,821
1919	..	19,548,810	1,232,095	923,589
1920	..	19,220,920	1,632,599	1,074,617
1921	..	22,802,097	1,910,914	1,055,260

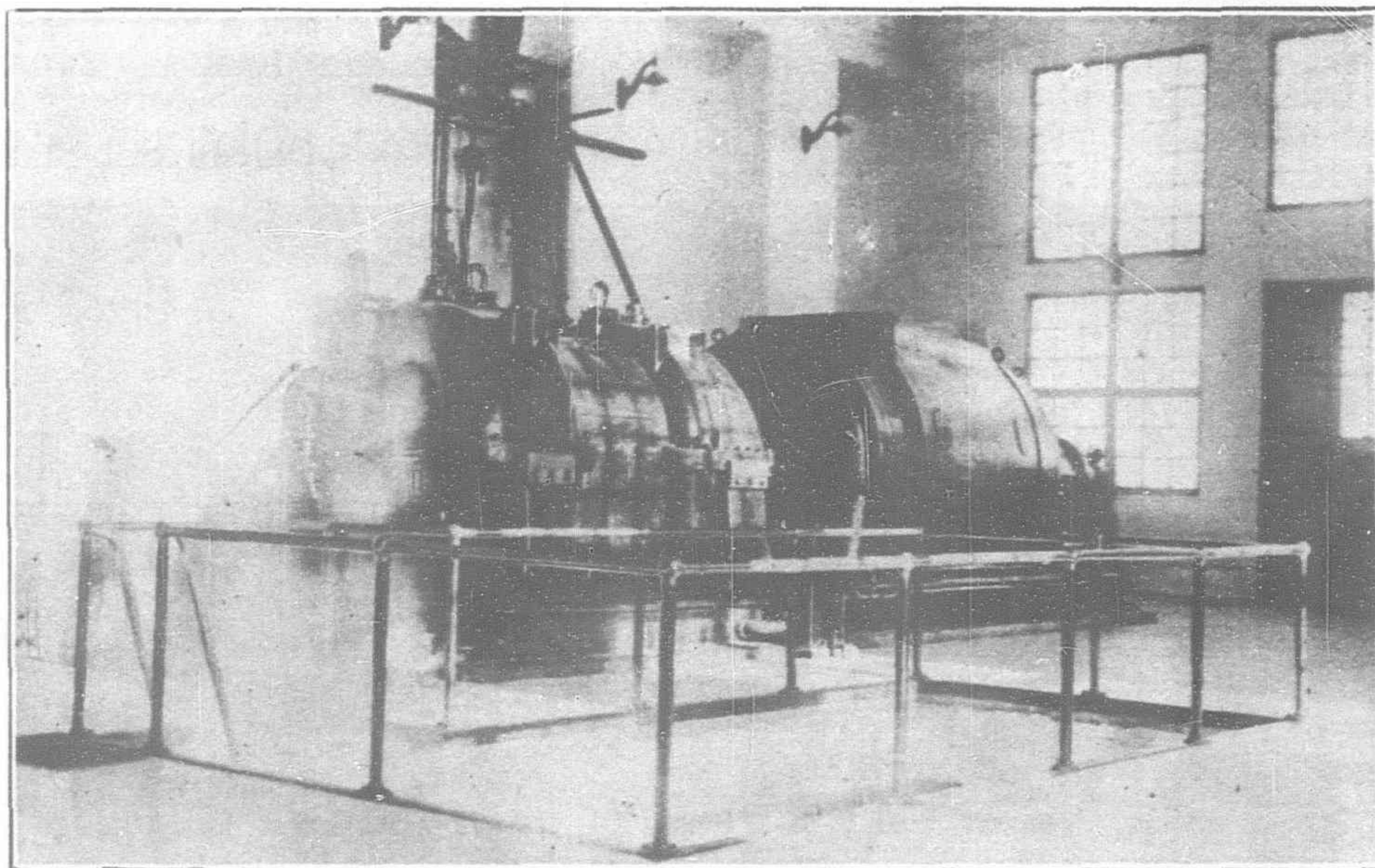


View of Amanogawa Power House, Dairen

Power Plant Equipment

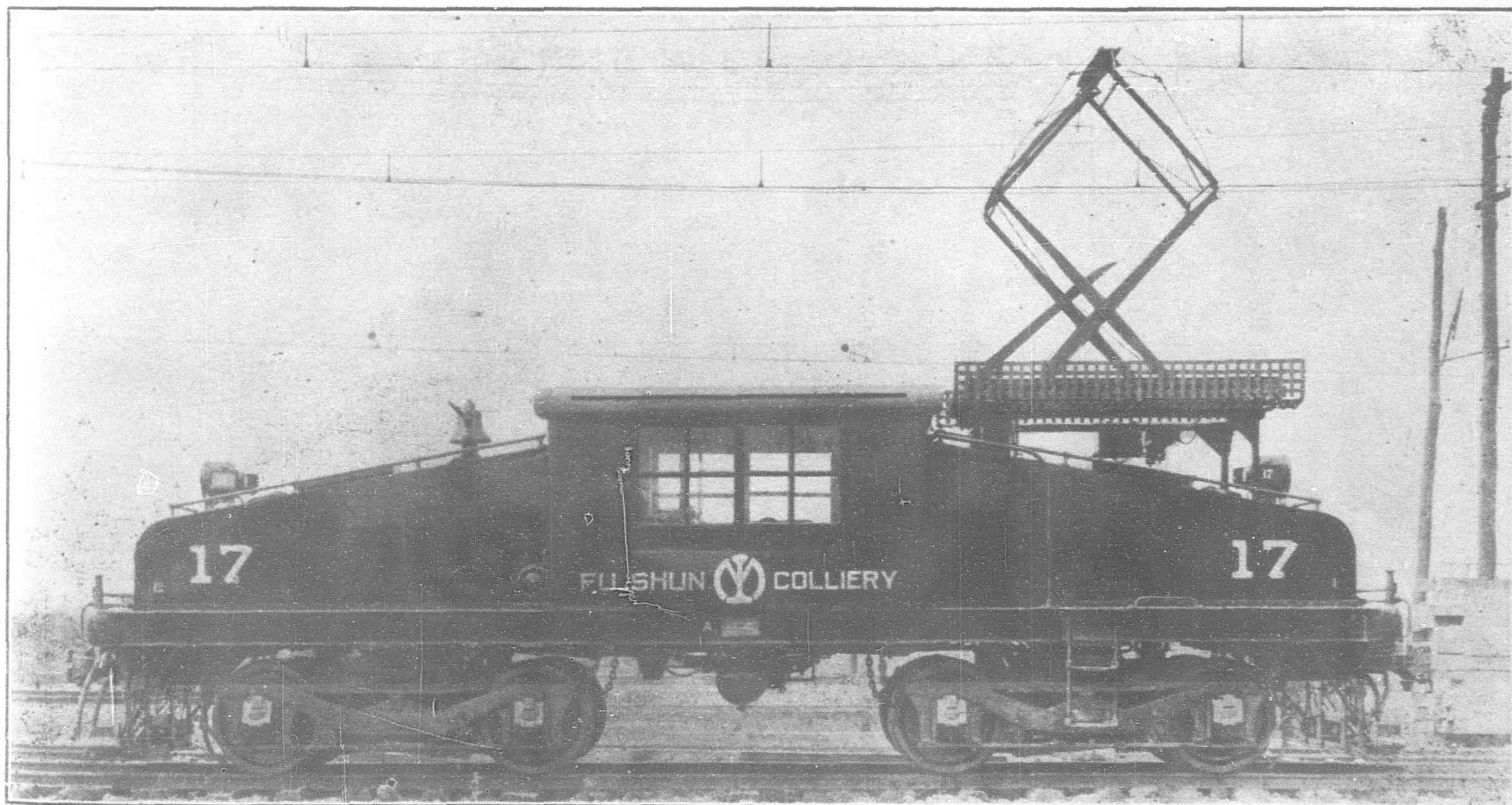
The Hamacho power plant has a lamp capacity of 550,000, of which 250,000 lamps are in use, at a cost to the consumer of Y.1.20 per 16 candle power lamp. The No. 1 power house has a capacity of 6,000 k.w. and No. 2 of 5,000 k.w. The original Hamacho station (No. 1) supplies 24,033 consumers with 171,594 lights of a total candle power of 7,127,520 and 227 consumers with 7,000 horse-power for 516 motors. The equipment of this plant is as follows:

Generators. — A.C.,



5,000 K.W. Westinghouse Turbo-Alternator installed in the Amanogawa Power House, Dairen

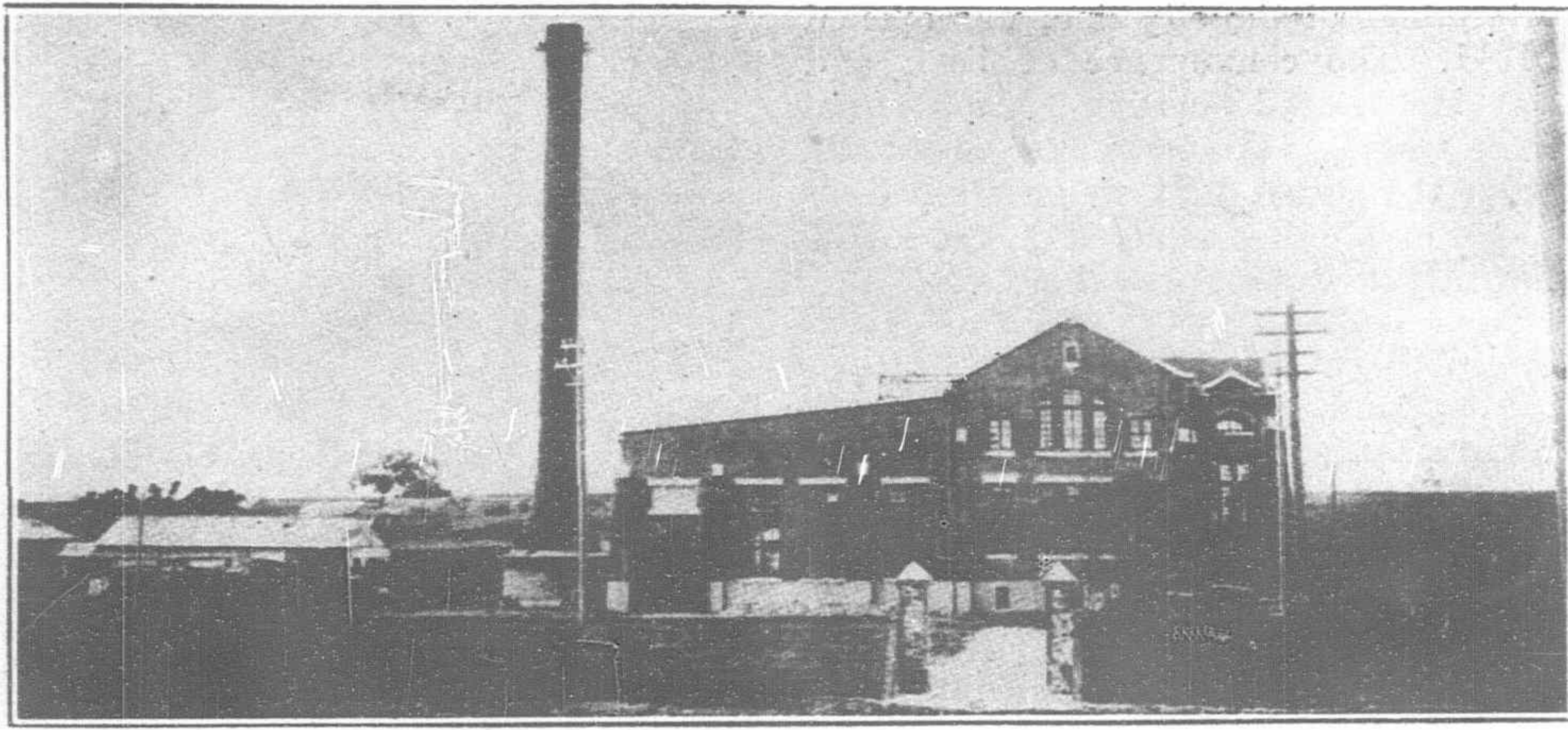
3 G.E. 1,000 k.v.a.; 2,300 v.; 25 cy.; 125 r.p.m.; direct connected to McIntosh and Seymour ver. comp. engines; 1, 1,875 k.v.a., 2,300 v.; 25 cy.; 1,500 r.p.m.; G.E., Curtis turbine set; 1, 1,875 k.v.a., 2,300 v., 25 cy., 1,500 r.p.m.; G.E., Curtis geared turbines set. Exciters; 2, 100 k.w. Mitsubishi; 1, 75 k.w. G.E.; 1, 30 k.w. G.E.; 125 v.; direct connected. Boilers: all B. & W., 8, 3,530 sq. ft. h.s.; 1, 5,090 sq. ft. h.s.; 150-lb. working pressure; Jones under-feed stokers. Blowers, 3; pumps, 5; open heaters, 1; coal saving and crushing appliances.



1,200 volt G.E. Locomotive operating at the Fushun Colliery of the S.M.R.

In order to supply the growing needs of the suburban districts, the S.M.R. last year completed a new power house located on the road to Star Beach. This is known as the Amanogawa power house, a model of its kind, in steel and reinforced concrete designed for 30,000 k.w. The present equipment consists of: Boilers, 3, 7,135 and 1, 8,283 sq. ft. h.s. with 144 and 168 sq. ft. grate sur. respectively, B. & W. boilers equipped with Westinghouse stokers: 2 vertical Weir boiler feed pumps with enclosed heater; 2 Buffalo forge fans driven by Westinghouse motors for forced draught. 1, Westinghouse turbo alternating set of 6,250 k.v.a. 11,000 v., 50 cy., 3,000 r.p.m., direct connected exciter, 45 k.w., 125 v.; Switchboard equipped throughout with G.E., instruments, switches, transformers, etc., made by the Shibaura Engineering Works.

In addition to the three power houses supplying the needs of Dairen, the S.M.R. operates a plant at Shakako a few miles out of the city for the service of the immense railway shops located there. This is an English plant throughout. The equipment consists of 3 batteries of B. & W. boilers with superheaters and chain grate



S. M. R. Power House at Changchun

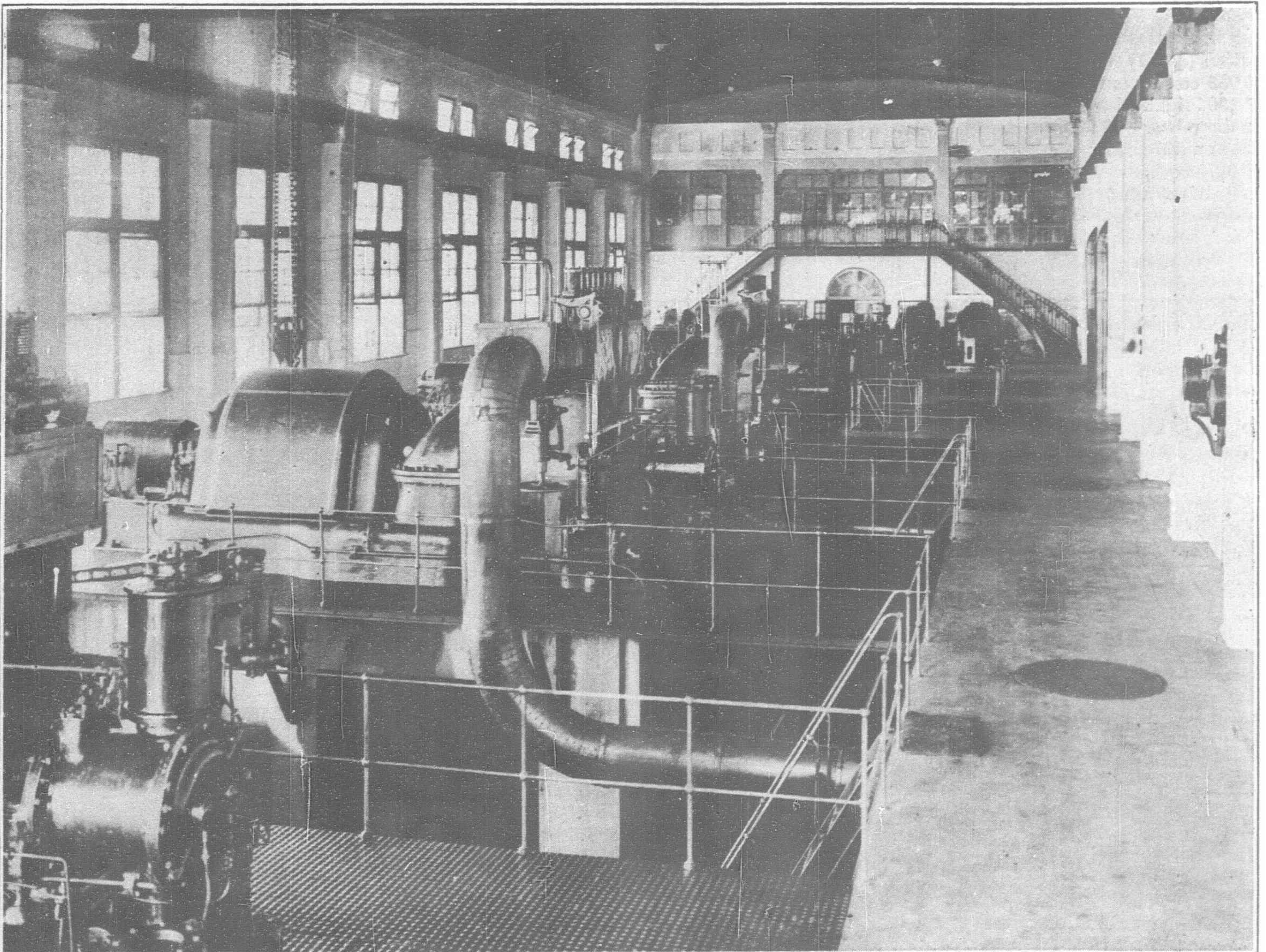
stokers; 5 Green's fuel economizers; steel chimney, 157-ft. high; automatic coal storage and conveyors; 3 Weir ver. feed pumps.

2 Bellis & Morcom compound two-crank, two-cyl., vertical enclosed non-condensing engines 570 b.h.p. direct connected to 2 Dick, Kerr direct current 400 k.w. generators, 250 v. Two motor generators 250 k.w. each, made by the Shibaura Engineering Works, 370 b.h.p., 200

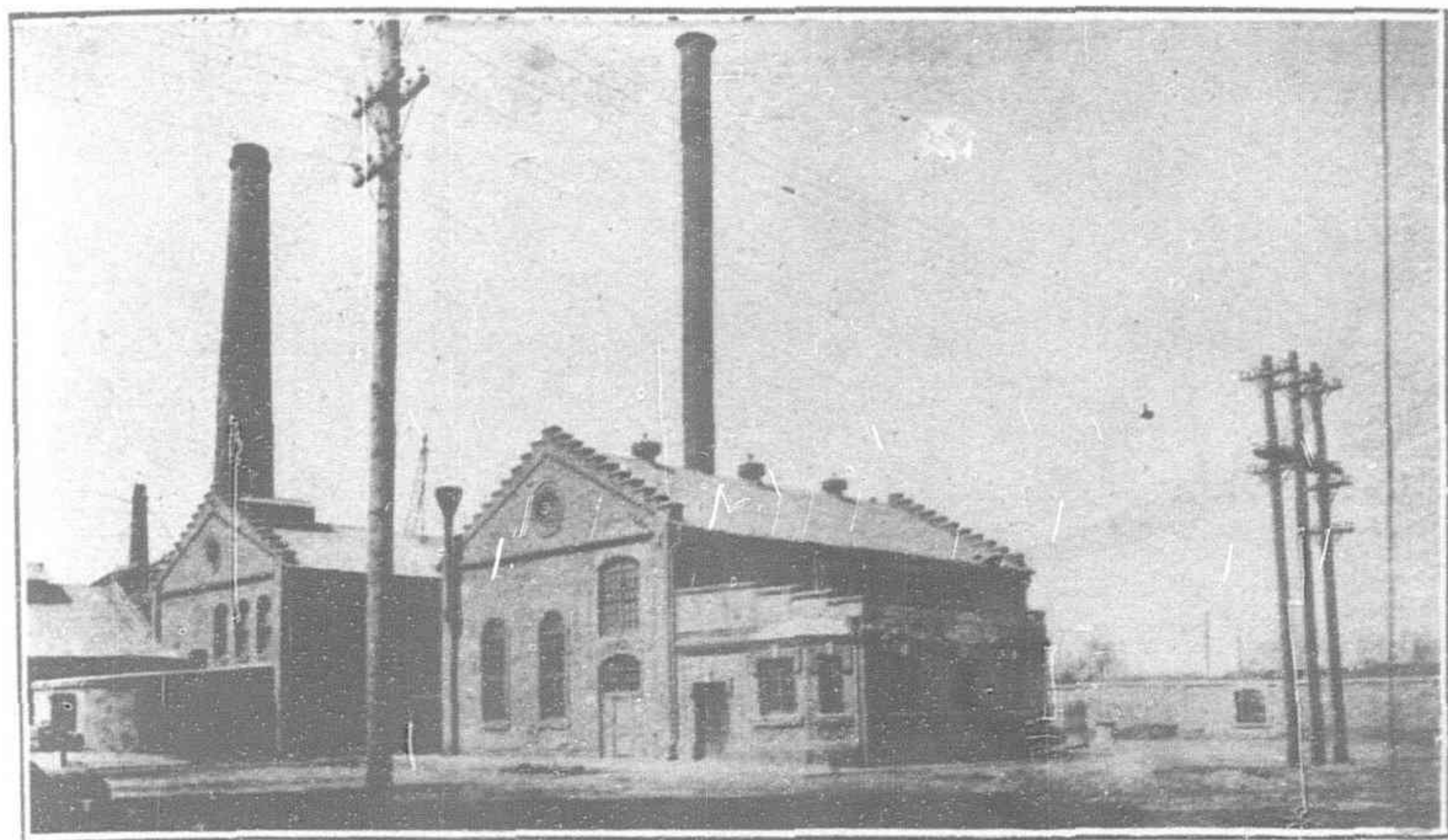
v., 3 ph. 25 cy. induction motors coupled to two 125 k.w. 250 v. dir. cur. dynamos at each end of same shaft, receiving current from the Dairen central station. Switchboard: 23 panels.

Dairen Sub-Stations

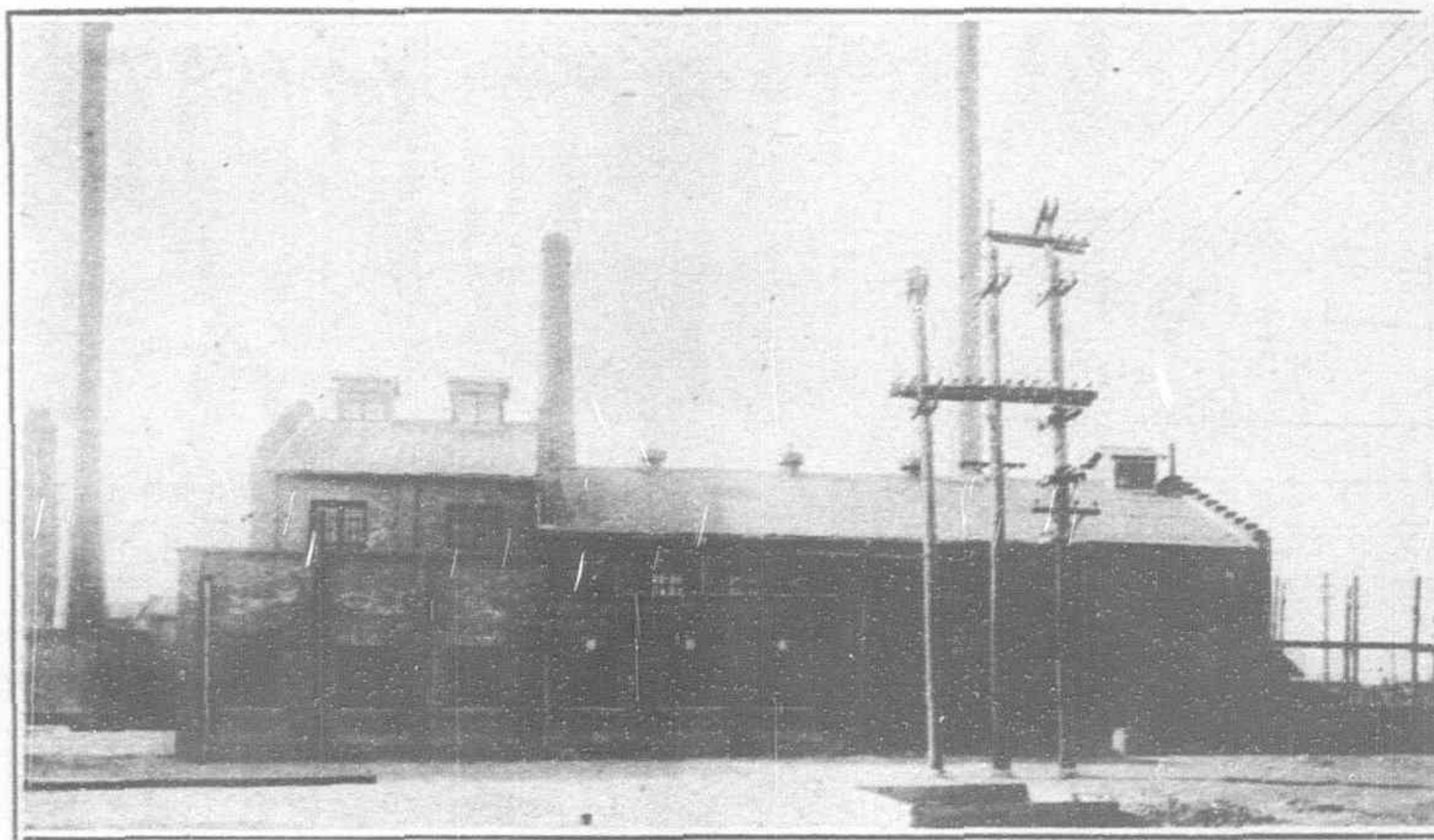
There are five transformer stations in Dairen. At the Hamacho power house there are six 350 k.w. 25 cycles, indoor single-phase oil cooling transformers made at the Shakako works of the S.M.R. with a primary voltage of 2,000 to 2,300 and secondary of 6,000 to 6,600. At Shakako there are also six of the same type which receives the current from the above and transforms it back to the



Electric Generating Room of the Mond Gas Plant at the Fushun Mines of the S.M.R.



As it appeared in 1921, before the addition of the new 1,500 G. E. Turbine Set.



The Extended Plant in 1923.

THE CHINESE GOVERNMENT PLANT AT MUKDEN.

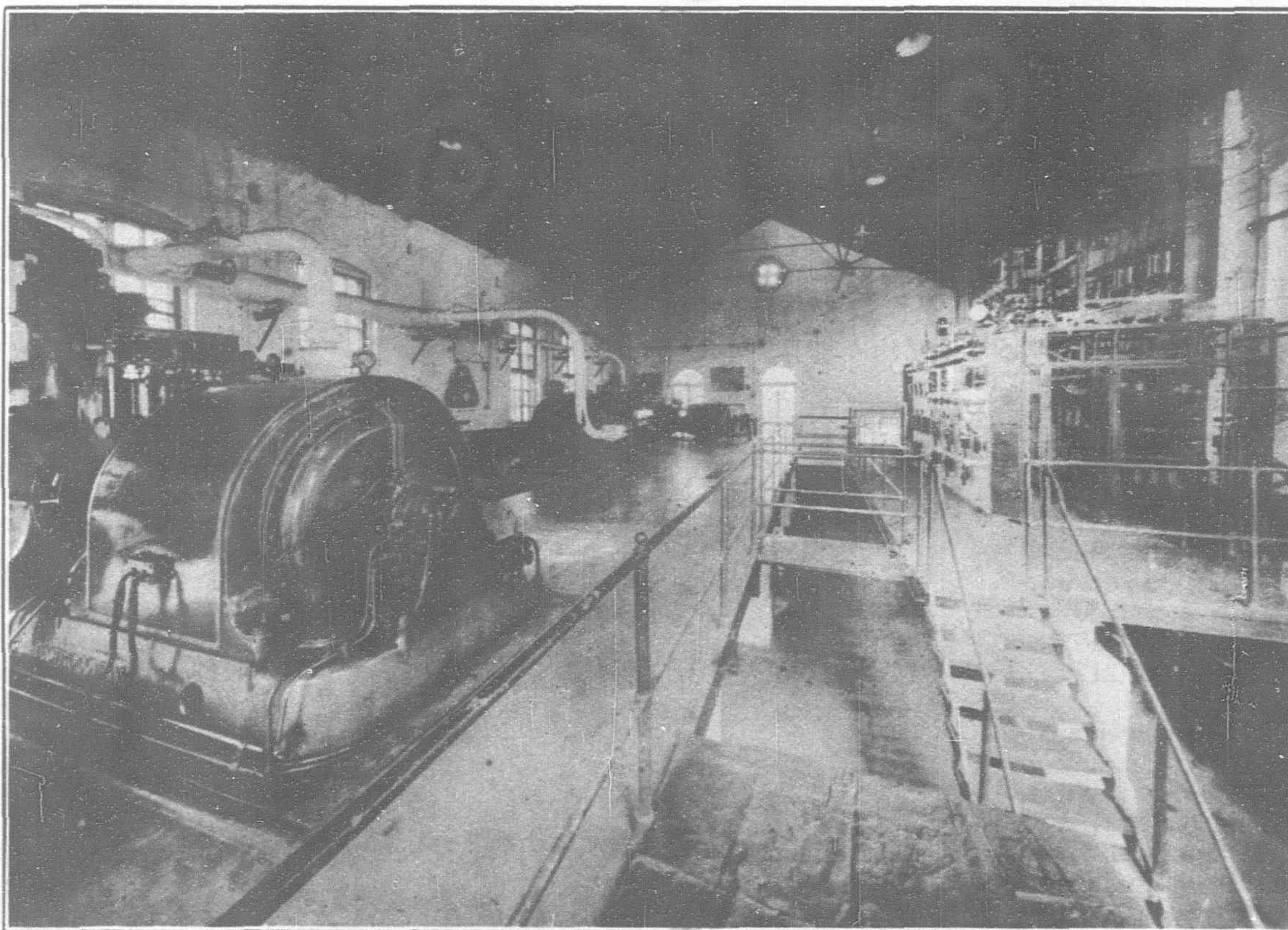
primary voltage. At Jinja-ura, in Dairen, there are installed three 1,500 k.w. outdoor transformers made by the Shibaura Engineering Works, receiving a primary voltage of 10,600 and delivering

a secondary voltage of 3,300, 50 cycles. The Nagato-cho sub-station is equipped with four 2,000 k.w. indoor type transformers receiving a primary voltage of 11,000 and transforming to 3,300 volts, 50 cycles. These are also from Japan, manufactured by the Yasukawa Electric Company. The outdoor sub-station at Daiboshin, has three 100 k.w. Okumura transformers receiving the current at 11,000 and sending it out at 3,300 volts,

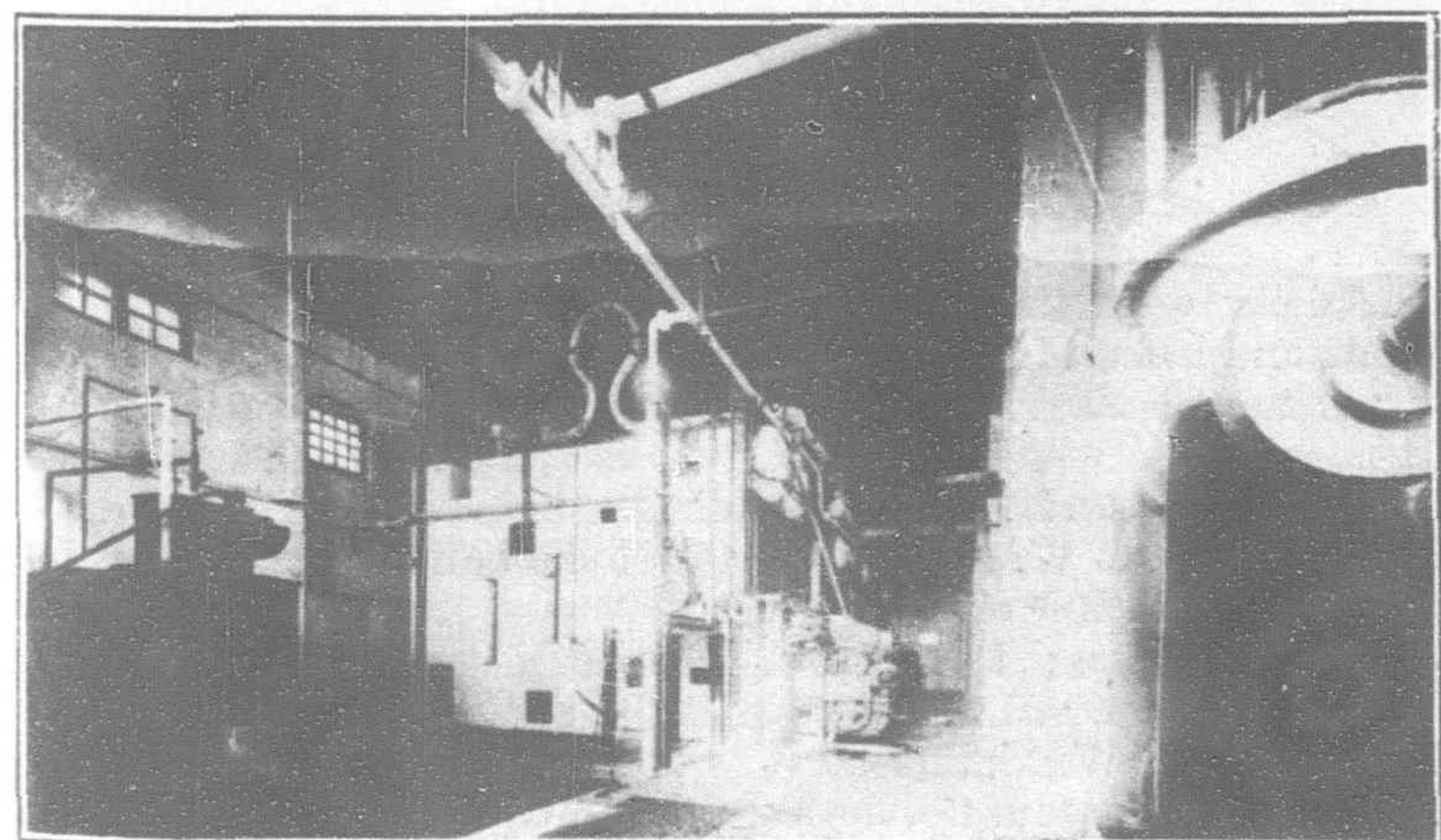
50 cycles. There is also the Chusuitzu outdoor station equipped with three 150 outdoor type transformers receiving current at 10,000 to 11,000 volts and transforming to 3,300 volts 50 cycles.

This equipment was made at the Kobe works of the Mitsubishi Company. The Hamacho station has also three 400 k.w. rotary converters manufactured by Dick, Kerr & Company converting a 2,300 volt alternating current to 550 volts d.c. The Nagato-cho substation has also a Westinghouse frequency converter of 2,000 k.w. capacity and the Jinja-ura sub-station two rotary converters.

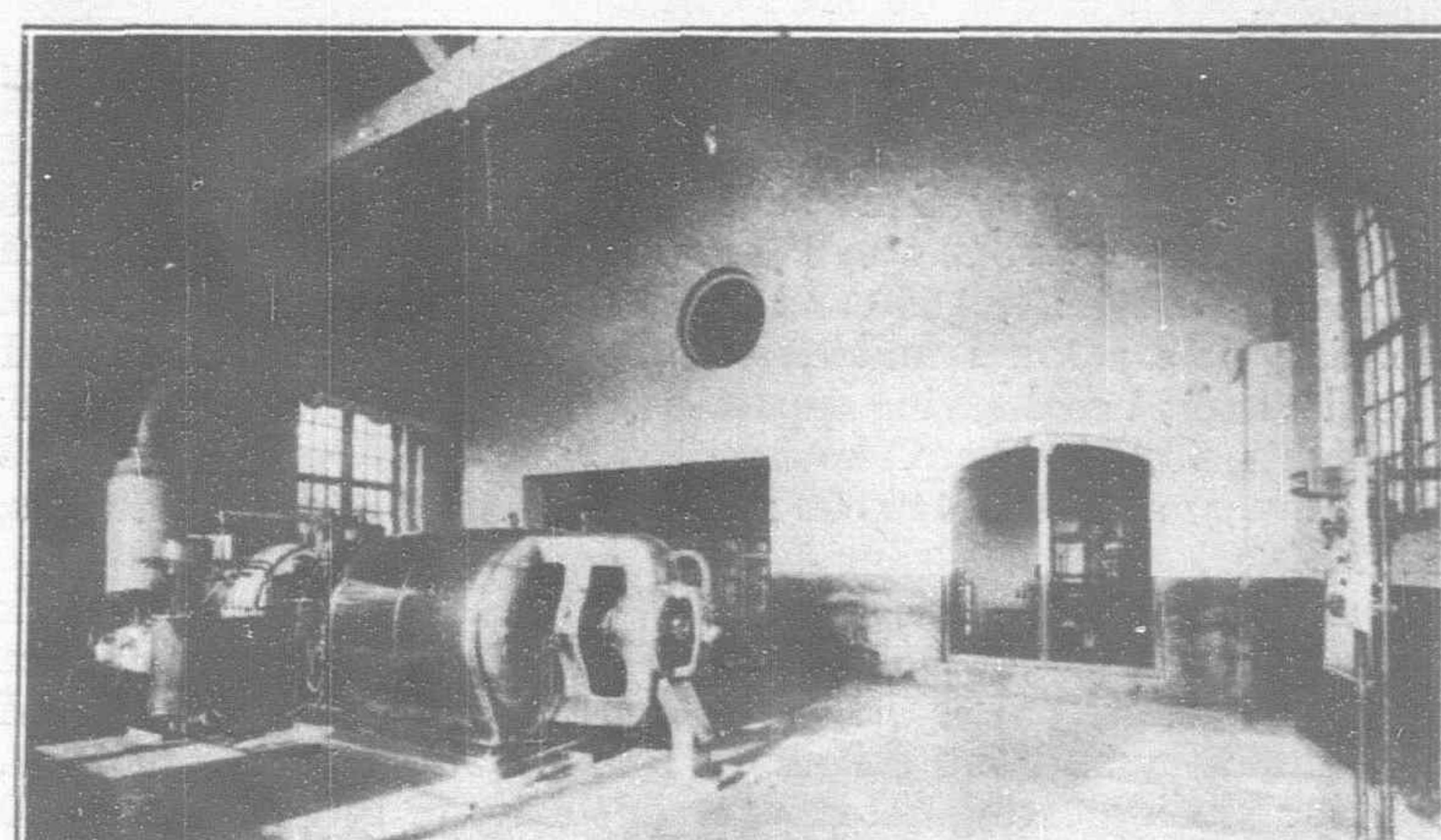
MUKDEN. -- The S.M.R. electrical plant at Mukden began to sup-



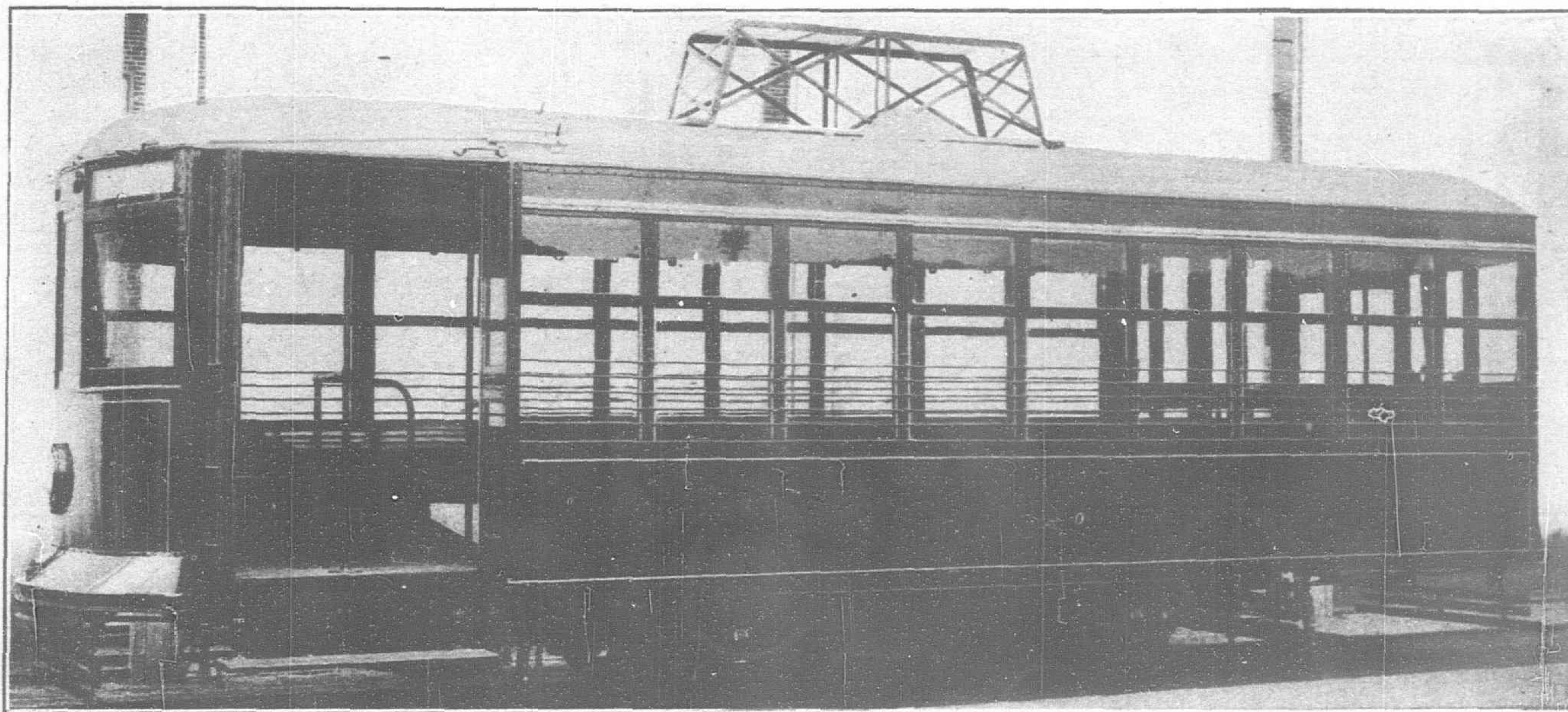
Mukden Government Plant before the 1,500 KW. addition



Mukden Government Power House: The Boiler House



The 1,500 KW. G.E. Turbo-Alternating Set

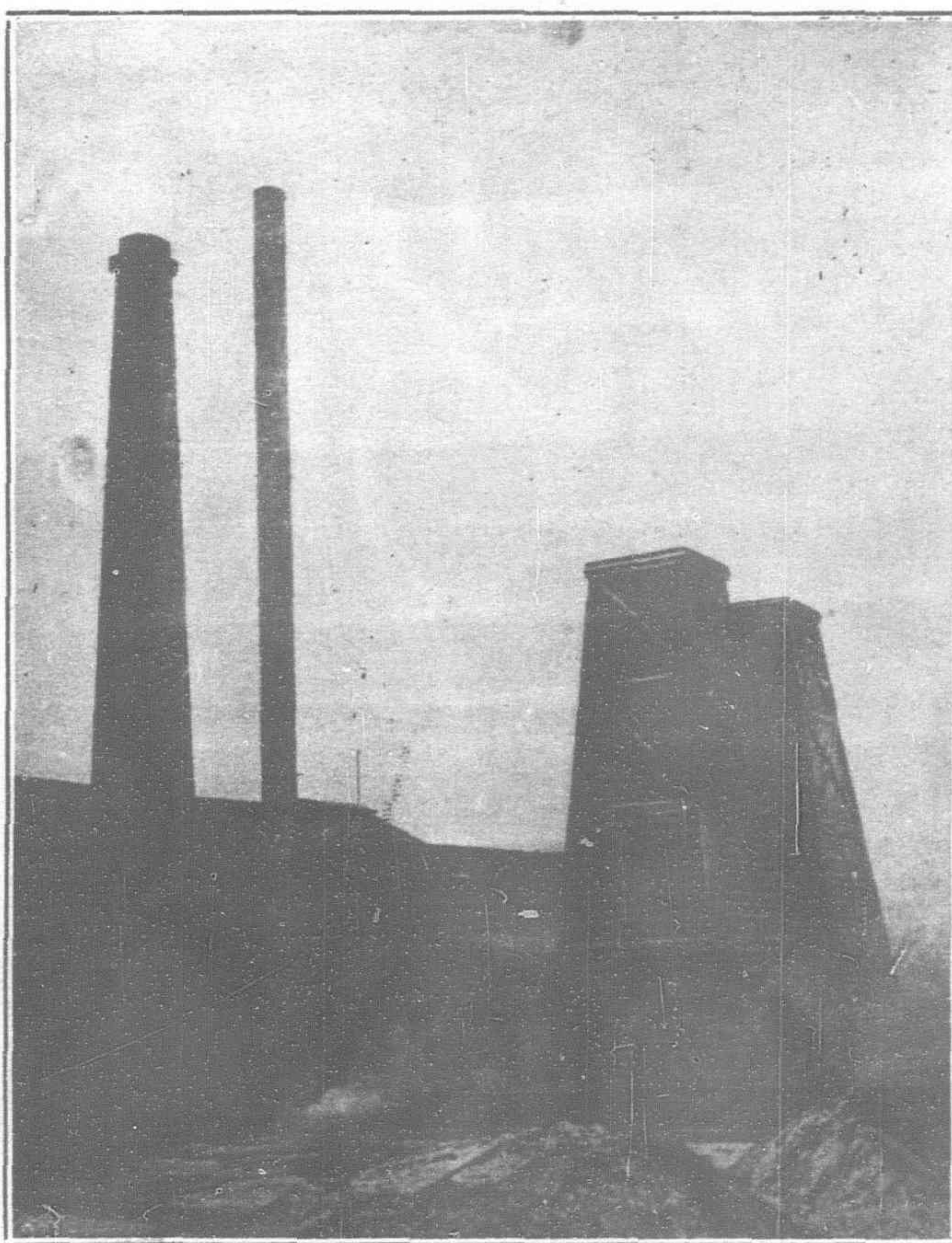


Birny Safety Tramcar Built by the Brill Company for the Dairen Tramways

ply the railway town adjacent to the station in June 1908. The plant has a capacity of 1,200 k.w. and is equipped with one 200 k.w. British T. H. a.c., generator, direct connected to Bellis & Morcom comp. vertical engine, 3,300 v., 50 cy., 375 r.p.m.; belt driven B.T.H. exciter; 115 k.w., 100 v.; two 500 k.w. generators, 3,300 v.; 50 cy., 375 r.p.m.; made at the Shakako Shops of the S.M. Railway; driven by Bellis & Morcom engines; 1, 18 and 1, 20 k.w., 110 v., d.c. exciters made by Shakako works. Boilers: 2 B. & W. 2,690 sq. ft. h.s. and 1, 5,090 sq. ft. h.s.; 48 and 96 sq. ft. grate; working pres., 140-lb.; Jones underfeed stokers; blowers, 1; pumps, 4; open heater, 1; closed 2; No. of lights (10 c.p.), 1920, 75,946; power, 1,846,638 h.p. Receipts, 1920, Y.395,317; Expenditures, Y.318,759.

CHANGCHUN.—The Changchun station of the S.M.R. was originally equipped with three generators and steam appliances taken from the old Russian Dairen installation but later on three new 500 k.w. sets were installed. Service was commenced in February 1910. The present plant has a capacity of 3,400 k.w. and is equipped with one 1,400 k.w. Stal turbo-alternator, 3,300 v.; 50 cy., 3,000 r.p.m.; two 250 k.w., B.T.H. a.c. generators, 3,300 v., 42 cy., 158 r.p.m. driven by Ganz engines and three 500 k.w. Shakako generators, 3,300 v., 42 cy., 360 r.p.m. driven by Bellis & Morcom engines. Boilers: 4, 2,690 and 2, 5,090 sq. ft. h.s. B. & W. 150-lb. working pres.; Jones underfeed stokers; 3 blowers; 5 pumps; 1 closed heater; 1 coal-saving apparatus. Report at end March, 1921: No. lights, 66,141 (10 c.p.) houses, 3,375; power supplied, 2,328,408 h.p.; k.w. generated, 4,419,690; Receipts, Y.420,892; Expenditures, Y.370,468.

ANTUNG.—On January 1, 1911, the S.M.R. Company took over the works of the Antung Electricity Co. and set about building a new power house equipped with one generator of 100 kilowatts and two others of 100 kilowatts each. In 1917, another reciprocating steam engine-driven generator of 80 kilowatts and also a suction gas generator of 150 horse-power were added, and were put in operation in November of the

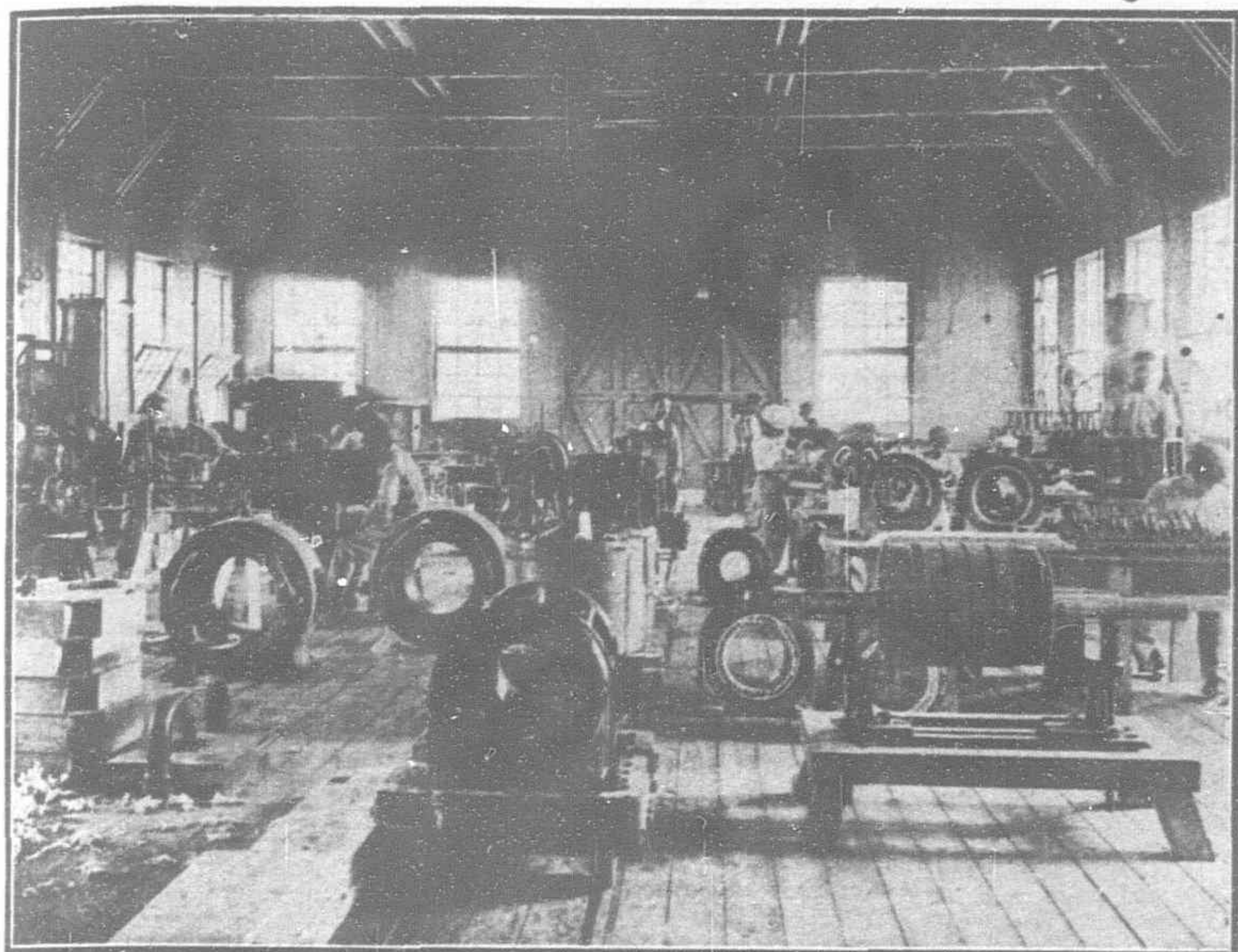


Kirin Electric Light Plant

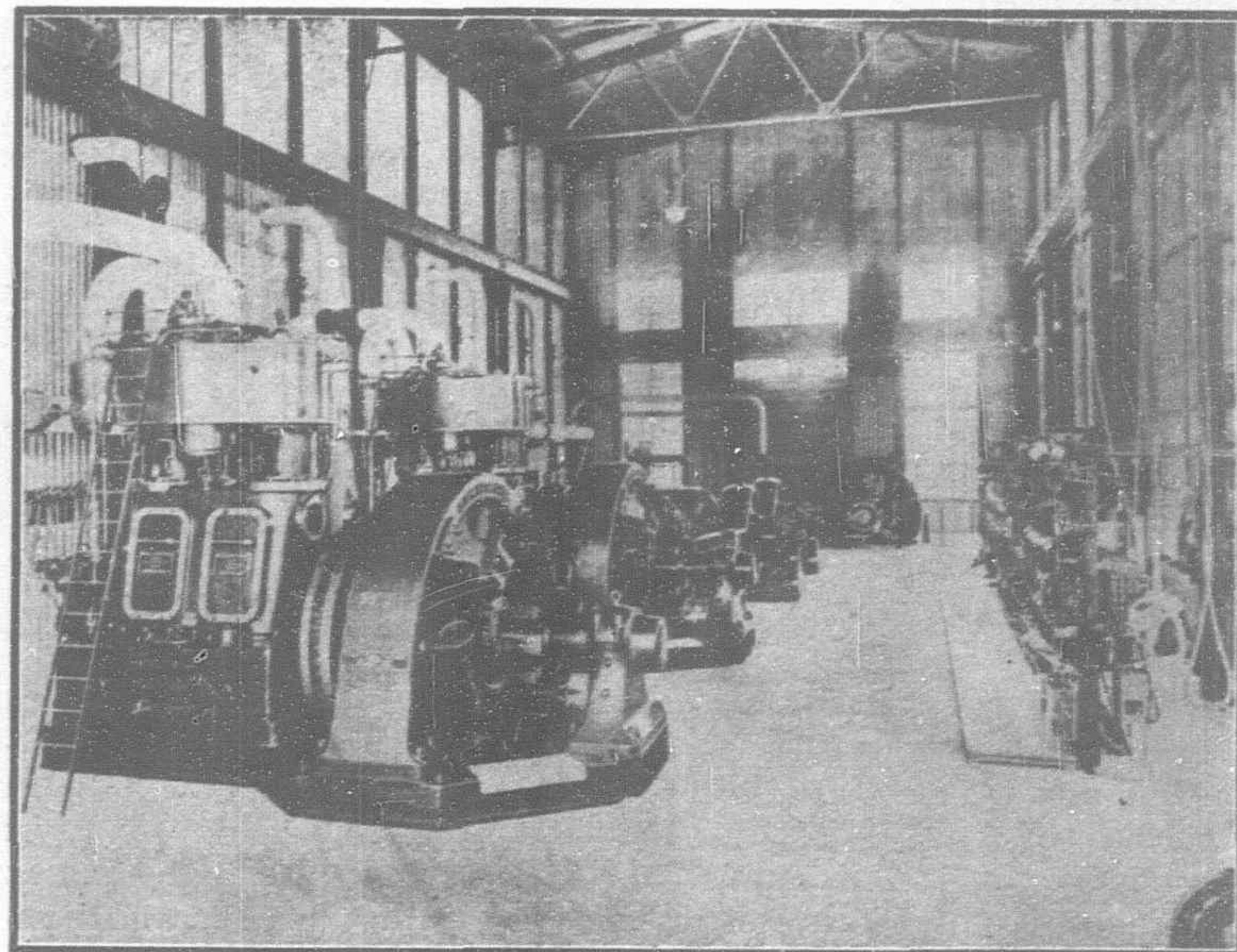
same year. This still failing to satisfy the demand, a generator of 100 horse-power and a gas generator of 150 horse-power were additionally installed in power house No. 2. Further, the construction of a third power house with 2,000 kilowatts capacity was started in the fiscal year 1918.

The total capacity of the plants is 8,500 k.v.a. The 2nd Antung plant has a capacity of 375 k.w. and is equipped with three A.E.G. a.c. generators, 125 k.w. each, 3,300 v., 50 cy., 187 r.p.m. belt driven by M.A.N. suction gas engines: 1 blower. 3rd Antung plant: Capacity, 8,500 k.w.; two 500 k.w. a.c. Shakako generators, 3,300 v., 50 cy., 375 r.p.m. driven by B. & M. vert. comp. engines: exciters, 2, 16, k.w., 110 v. d.c. Shakako works. Two 3,750 k.w. Westinghouse turbo-alternating sets, 3,300 v., 50 cy., 3,000 r.p.m.; exciters, d.c. 18 k.w., 125 v. Boilers: Two of 7,135 and 1 of 8,283 sq. ft. h.s. B. & W. 150-lb. w.p.; Westinghouse underfeed stokers; 2 blowers; 2 pumps; 1 open heater; 1 coal-saving appliance. Report end of March, 1922: No. of lights (10 c.p.), 78,020 in 6,068 houses; power, 2,179,521 h.p.; k.w. generated, 1921, 6,431,825; Receipts, Y.616,328; Exp. Y.489,258. Profits, 1921-22: G. Y.125,029.14.

PORT ARTHUR.—The electrical plant at Port Arthur is owned by the Kwantung government but is generally supervised by the electricity department of the S.M.R. It supplies about 21,000 lights and has an installed capacity of 1,000 k.w., A.C.; h.t., 2,300 v.; l. t., 100-220 v.; 3-phase, 3-wire, 60 cycles; power factor, 0.8. It is equipped with 2 B. & W. boilers 6,182 sq. ft. h.s. each, and 2 Heine, 2,870 sq. ft. h.s. each; chain grate stokers; working pressure, 180-lb. for B. & W. and 130-lb. for Heine boilers; B. & W. boilers superheated 1,700 deg. F. The fuel used is Fushun bituminous coal. Generators: 1,500 k.w. Shibaura generator, driven by W. H. Allen Sons Co. vertical, trip. exp. condensing engine 750 b.h.p.; and 2 Westinghouse generators, 250 k.w. each, driven by McIntosh & Seymour Co. horizontal, compound condensing engines, 400 b.h.p. each. Vacuum, 26-in. for normal working. Working pressure, 170-lb. for 730 b.h.p. engine and 120-lb. for 400 b.h.p. engines.



Motor Winding Room.



Power House.

ELECTRICAL SHOP IN THE SHAKAKO WORKS OF THE S.M.R. NEAR DAIREN.

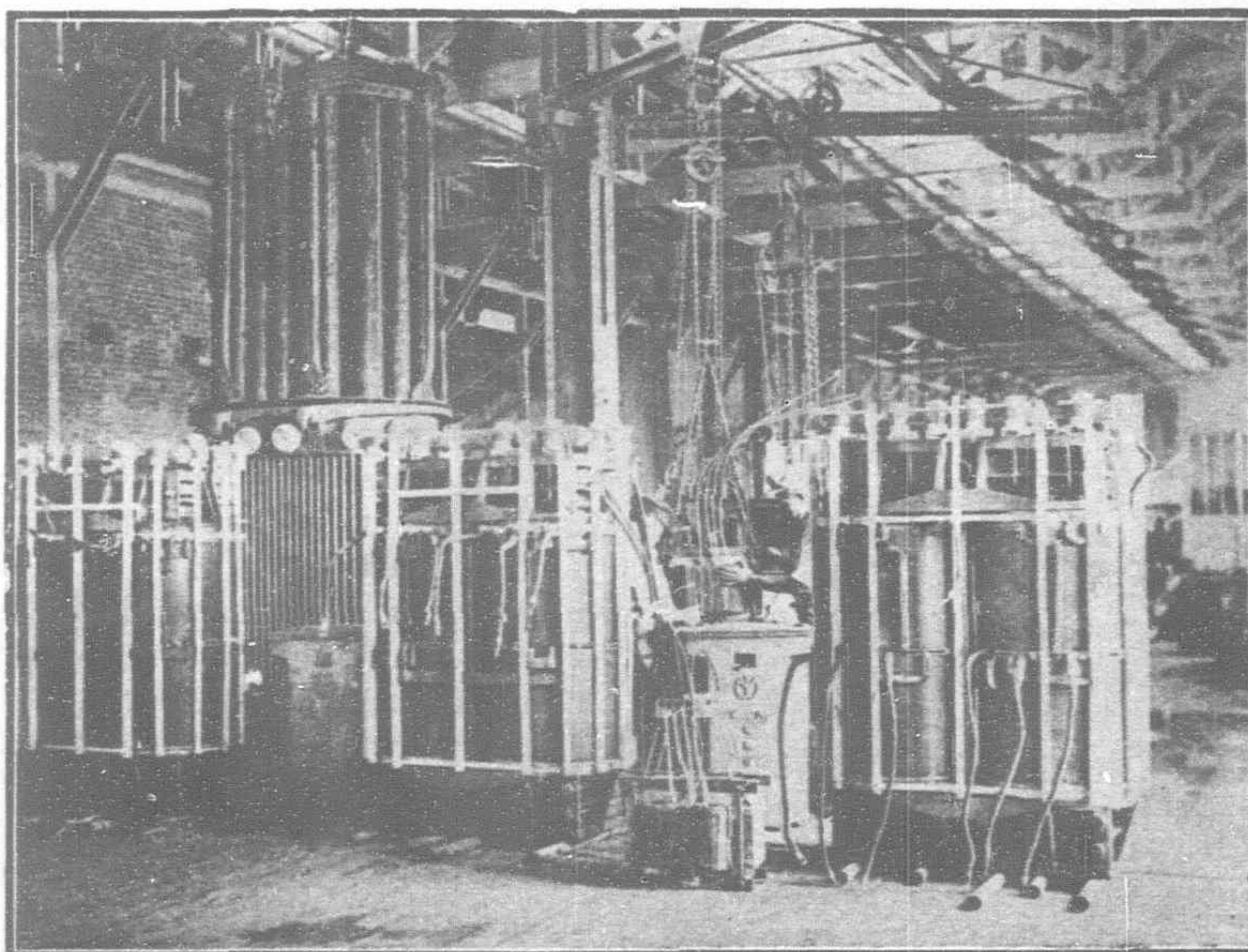
NEWCHWANG.—The Newchwang plant, having a capacity of 850 k.v.a., is operated by a private company called the Yinkou Waterworks and Electric Company, Ltd., organized under Japanese laws with a capital of Y.2,000,000 of which 500,000 is paid up. The S.M.R. controls a large part of the shares and supervises its operation. The equipment is as follows: One 300 Bruce Peebles, a.c. generator 3,500 v., 50 cy., 375 r.p.m. Bellis & Morcom v.c. engine; one 200 k.w. A.E.G. a.c. generator, 3,300 v., 50 cy., 430 r.p.m. driven by an Allen engine and one 350 k.w. A.E.G. 3,300 v. 50 cy., 375 r.p.m., driven by a B. and M. v.c. engine. Boilers: 3 B. & W., 3.14 sq. ft. h.s.; 140-lb. w.p.; Jones stokers; 2 blowers; 4 pumps; 1 open heater (1921); No. of lamps (10 c.p.), 33,256; total c.p. As previously noted a new 1,000 k.w. set is being installed.

TIEHLING.—The Tiehling plant also operated by the S.M.R. has a capacity of 450 k.v.a., and is equipped with one 200 k.w. B.T.H. a.c. generator, 3,300 v., 50 cy., 375 r.p.m. ver. comp. engine; one 250 k.w. G.E. generator, 200 r.p.m. horizontal comp. engine, McIntosh & Seymour. Boilers, 2, 700, 1, 800 and 1, 1,040 sq. ft. h.s., Takuma and 1, B. & W. 2,690 sq. ft. h.s. with Jones stokers. 1 blower; 4 pumps; 1 open and 1 close heater; No. of lamps, 1921, 8,552; 177,950 c.p.; 1,115 consumers. No power is sold.

TASHIHCHIAO.—The S.M.R. Tashihchiao plant is equipped with one G.E. d.c. generator, 59 k.w., 220 v., 310 r.p.m., driven by a vert. comp. marine engine; boilers: 1, 900 sq. ft. h.s. Lancashire and 1, 600 sq. ft. h.s. Takuma boiler, 120-lb. w.p.; 2 pumps; No. of lamps, 1921, 3,045; 59,620 c.p.; 723 houses. No power sold.

KUNGCHULING.—The plant at Kungchuling was opened in March 1917 by the S.M.R. Company, having a capacity of 150 k.w. It is equipped with one Okumura a.c. generator, 3,300 volts, 50 cy. 500 r.p.m., belt driven by a hor. comp. engine and one same make and capacity direct drive, by a vert. comp. marine engine; excitors, Okumura. Boilers: 1 Lancashire, 850 and 1 Takuma, 840 sq. ft. h.s. 120-lb. w.p.; 3 pumps; 1 closed heater; 1921, No. of lights, 7,489; 117,500 c.p.; 1,212 houses; 2 motors, 175 h.p.; 1 consumer.

LIAOYANG.—At Liaoyang, the plant is operated by a Sino-Japanese Company in which the S.M.R., representing the Japanese



Assembling Transformers at the Shakako Works.

interests, took one-half the share capital of Y.1,200,000, the other half distributed between the Chinese merchant guilds and the Chinese town council. The company has been successful, paying dividends of ten per cent. for 1921-22. The plant of 316 k.v.a. has a lamp capacity of 24,000 16 c.p. lamps, of which 13,000 are in use. The equipment of the plant is two Dick-Kerr 100 k.w. sets, 3,300 v., 50 cy., 375 r.p.m.; one Mather and Platt generator, 116 k.w., 3,000 v., 60 cy. 450 r.p.m., driven by a vertical compound Allen engine. There are three B. & W. boilers, 870 sq. ft. h.s. 145-lb. w.p.; one Lancashire, 735 sq. ft. h.s.; 90-lb. w.p.; 3 pumps; 1 open heater. Fuel, coal; 4,888 tons used in 1922.

The demand for power created by the erection of the new Manchurian Cotton Mill at this place is being supplied from the plant at Fushun.

FUSHUN COLLIERIES.—In the operation of the great Fushun collieries the S.M.R. Company has shown its progressiveness by employing the most modern and efficient methods of production. A very poorly equipped electrical plant found on the property when taken over from the Russians has been extended in accordance with the ever increasing needs of the colliery and town to a capacity of 31,500 k.w. There are now three electric power houses at the mines, one of which is kept as a reserve. The No. 1 plant (reserve) is equipped with two 1,000 k.w. C. A. Parsons turbo-alternating sets and No. 2 with two 1,500 k.w. A.E.G. and three 3,000 k.w. G.E. Curtis turbo-alternating sets, connected with eleven Mond gas plants consuming 240 tons of coal per day, and fourteen Lym gas producers. The gas is burned under the boilers after recovering the bye-products of coal tar and sulphate of ammonia.

The third plant is an innovation in applied engineering, as here the S.M.R. has erected the first pulverized coal installation in China. This plant with a capacity of 17,500 k.w. is equipped with one 5,000 k.w. and one 12,500 k.w. G.E. Curtis turbo-alternators. A Holbeck pulverized coal installation permits the use of sweepings, dust and inferior grades of coal for which no market is available. There are three Bonot's pulverizers reducing coal to particles of about 1-10,000 of an inch, having a capacity of 5 tons per hour. The reinforced concrete chimney attached to this plant is 260 feet high and 14 feet in diameter.

In addition to the generation of light and power for the mines and the adjacent towns the above plants furnish current for the operation of an electric railway which transports the coal from the pits to the main line of the S.M.R. at Mukden. This line is equipped with three G.E. electric locomotives moved by four 100 h.p. motors each. There is also a 25-ton shunting electric loco at the pits equipped with two 55 h.p. motors. The line has an automatic block signal system supplied by the Union Switch and Signal Company.

Three thousand kilowatts are transmitted from the mines to Mukden and Liaoyang for lighting and industrial purposes. This is to be increased this year to 9,000 k.w.

Other Small Plants

Other small plants operated by the S.M.R. are located at Szuping kai, Kaiyuan, Kiaotow and Wafangtien. With the exception of the one at Kiaotow these are Sino-Japanese enterprises in which the S.M.R. represents the latter interests. The plant at Szuping kai was established in 1917 with a capital of Y.60,000. It has a capacity of 135 k.w. and equipped with one 60 k.w. Mitsubishi direct current generator, 220 v., 500 r.p.m., driven by a vertical compound engine and one 75 k.w. Shakako d.c. generator, 220 v., 310 r.p.m. driven by a marine vert. comp. eng., boilers, 3 Takuma type 460 sq. ft. h.s. and one B. & W. 2,010 sq. ft. h.s. 120-lb. w.p. 2 pumps; 1 open heater; No. of lights, 1921, 5,568; 110,700 c.p.; 871 houses; no power sold.

The plant at Kaiyuan was established in 1912 with a capital of Y.500,000 of which Y.237,500 is paid up. The generator is operated by a gas engine connected to its own producer. There are 11,000 lamps in use. The Kiaotow steam plant is a small affair with a lamp capacity of 2,000, of which only 1,000 are in use. The Wafangtien plant was established in 1914 with a capital of Y.50,000. It has one 75 k.w. G.E. generator driven by a marine type vertical compound engine. In 1921, 2,912 lamps were in use. This completes the electrical activities of the S.M.R. in South Manchuria.

PENCHIHU PLANT.—At the works of the Penchiu Coal and Iron Works located at Penchiu on the Antung-Mukden division of the S.M.R. is an electrical plant for the service of the iron works, mines and town. This company is a Sino-Japanese enterprise under the management of Okura & Company. The plant has a capacity of 5,500 k.w. alternating current and is equipped with one G.E. 2,500 k.w. and two A.E.G. 1,500 k.w. turbo-alternating sets.

HARBIN.—At Harbin, in the old Russian zone, a Japanese concern registered as the North Manchuria Electric Power Company took over in 1918 the two Russian electricity works known as the Michikof and the Energia. This company, registered under Japanese law, has a capital of Y.1,200,000 and although it encountered many difficulties at the outset, is now on a solid basis and building a new power house to meet the increasing requirements of Harbin.

There are three electrical companies in Harbin. The plant of the Yueh Ping Electric Light Company, capitalized at \$1,500,000 (\$1,250,000 paid up), is located in the Chinese city of Fuchiatien across the Sungari river from the Russian town. Although of small capacity, only 1,200 k.w., it is most efficiently operated and maintained, furnishing 50,000 lights for house and street illumination. The equipment, supplied through Messrs. Andersen, Meyer & Company, is American throughout. There are two 600 k.w. G.E. Curtis turbo-alternators, three Stirling boilers fitted with B. & W. superheaters and Murphy stokers, two Worthington surface condensers, Cochrane feed water heater, etc.

The third undertaking is called the Harbin Electric Supply Company organized to supply light and power and operate a tramway system in that city. The company has passed through a series of financial difficulties and law-suits but we understand that the American contractors are on the ground and carrying out the construction of the tramway.

MUKDEN AND KIRIN.—The largest Chinese-owned plants in the three eastern provinces are located at the provincial capitals of Mukden and Kirin. Both are equipped throughout with American machinery supplied through the firm of Andersen, Meyer & Company. The Mukden plant has an installed capacity of 5,300 k.w. The generators consist of one 2,500 k.w., one 1,500 k.w., one 500 k.w., one 350 k.w. and one 160 k.w. all G.E. Curtis turbo-alternating sets. The boilers are of the B. & W. type with Worth-

ington condensers circulating and hot-well pumps with an Edwards air-pump. In addition, there is a Diamond soot blower, Buffalo forge air washer and cooling pond equipment. The plant is operated by the provincial government which controls the largest part of the share capital of \$1,200,000. An American engineer, Mr. J. E. Popper, is in charge. International politics plays a conspicuous part in the operation and equipment of the Mukden plant and in considering new extensions the engineers have to keep always in mind the reluctance of the Chinese to favor Japanese products. The logical source of fuel for the Mukden plant is the near-by mines at Fushun, but these are Japanese owned, while the officials who run the government and control the plant are all more or less interested in coal mines located in Kaiping district, over two hundred miles away and tributary to the Peking-Mukden line of the Chinese government. In 1921, when the question of adding the 1,500 k.w. extension was under consideration it was proposed to erect the new plant at Fushun, transmitting the current at 50,000 volts to Mukden. Coal at Fushun can be purchased at \$3.00 per ton against a cost of \$10 in Mukden. The other proposition was to increase the boiler pressure to 250-lb. instead of 150 and superheat to 200° instead of 120° and locate the plant near the railway in order to get coal direct into the boiler room instead of carting it five miles through the heart of the city at a cost of \$1.50 per ton. Both of these propositions were rejected and the new extension built on to the old plant. Since then, the engineer of the plant has been ordered to supply 1,000 horse-power to Chang Tso-lin's new Mukden arsenal. A further extension of 2,500 k.w. will soon be in operation. This is to be a G.E. Curtis turbo-set, with five feeder panels of 150 amperes capacity each, one 25-ton hand crane, two water-tube boilers of 6,182 sq. ft. h.s. each, one guyed steel stack 150 feet high and 8 feet diameter, one open type feed water heater and two pumps. This will bring the total capacity of the plant up to 5,300 k.w. with 2,485 boiler horse-power. This year an induced draft equipment will be installed for the two new 6,182 sq. ft. h.s. boilers. The first turbo set was ordered in 1909. It is a standard G.E. 500 k.w. set rated down to 350. In 1914, a 500 and a 160 k.w. set was ordered. All these sets have been in continuous operation since their installation without any repairs.

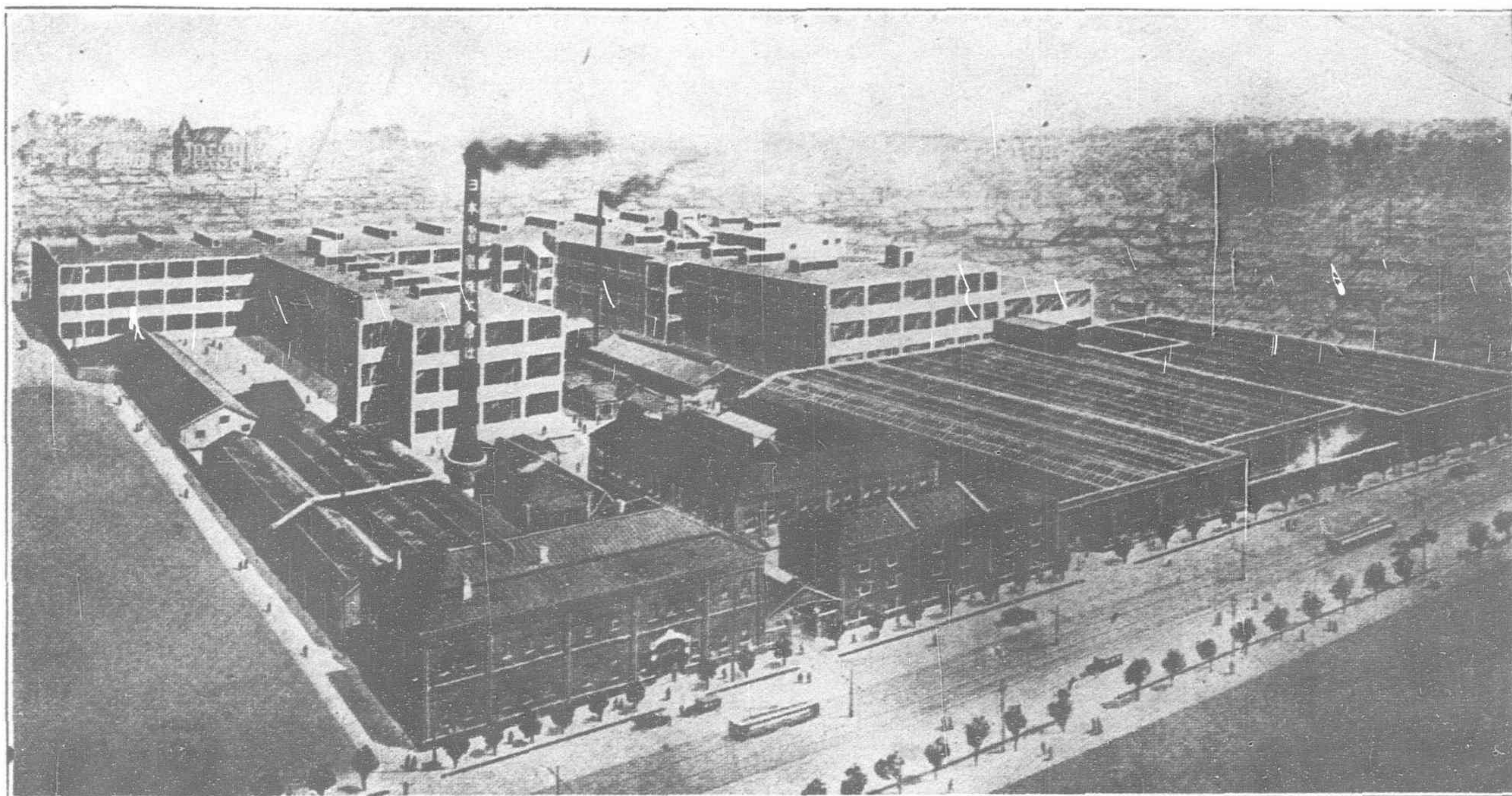
The 1,000 k.w. plant at Kirin is owned by a Chinese registered company having a capital of \$1,000,000. It is equipped with two 500 k.w. G.E. Curtis turbo-alternating sets, stirling boilers with superheaters, Murphy stokers, Worthington pumps, etc. New equipment purchased in America was installed in and placed in operation during 1923.

LEASED TERRITORY.—In addition to the above plants there are a number of smaller installations scattered throughout the Manchurian provinces. In the Kwantung leased territory are found a small gas engine plant at Pitzewo owned by Japanese with a capacity of 2,000 lamps, and at Pulantien there is another small Japanese-owned plant with a lamp capacity of 3,000, of which only about half are in use. The machinery for these two small installations was made in Japan.

CHINESE-OWNED PLANTS, FENGTIEN.—In the province of Fengtien in Chinese territory, there are a number of small Chinese-owned plants supplying the needs of their respective localities. At Chinchow, there is a 200 k.w. G.E. Curtis turbo set, with Worthington surface condenser and B. & W. boilers erected by Andersen, Meyer & Company. The company has a capital of \$300,000 and supplies current for 8,000 lamps. At Fukiatus is found a small 4,000 lamp steam generating set and at Liaoyuan a 300 k.w. plant owned by a company capitalized at \$200,000 which furnishes 5,000 lights. The Ming Sing Electric Light Company at Kaiping, has a little 60 k.w. G.E. generator belt driven by an Ames engine deriving steam generated in an Ames horizontal return tubular boiler. At Changtu, is a 3,000 lamp plant operated by steam and at Sian a company organized with \$120,000 began service in 1922. The Sifeng plant, with a 3,000 lamp capacity, is another 60 k.w. G.E. generator direct connected to a Reader vertical compound engine furnishing 1,600 lights to the public. At Tungliachen, is a 200 k.w. G.E. Curtis set with two Stirling boilers, superheaters, Worthington pumps and condenser, Harrison heaters, etc. This plant, together with those at Chinchow, Kaiping, and Sifeng were supplied through Andersen, Meyer & Company.

Another 1,000 k.w. G.E. turbo-alternating plant furnished by the same firm is installed in the Mukden cotton mill. Here also are found Stirling boilers, Murphy stokers, Worthington condenser

(Continued on page 102)



Nippon Electric Works, 1922

Twenty-five Years of Successful Co-operation in Japan

A Quarter Century Completed by the Nippon Electric Company, Limited

By D. F. G. Eliot, Comptroller, Nippon Electric Company

(Lacking only one month of the completion of a quarter century of uniformly successful operation, and with a happy personnel busily engaged on plans for a celebration on its twenty-fifth anniversary, the Nippon Electric Company on September 1, 1923 was one of the many victims of the recent earthquake disaster, resulting in the loss of one of its American representatives, a number of its Japanese employees and the destruction of a number of its modern buildings. Although but meagre reports have so far been received, plans are already in process for the creation of an even greater plant than that destroyed. In the following article, which was received just prior to the disaster, the remarkable progress of the Company is outlined. Its success has resulted from the able management of its Japanese directors, the efficient work of its employees, and the splendid co-operation between the Japanese and American interests; the Company may therefore look to the future with full assurance for continued progress and success.—EDITOR.)

OCTOBER 1, 1898 to October 1, 1923; twenty-five years of phenomenal growth and success have come to a close; twenty-five years of successful co-operation between American and Japanese interests have been completed, and the Nippon Electric Company, Limited, the affiliated company in Japan of the International Western Electric Company, Incorporated, with its first managing director, Mr. K. Iwadare, still active in the affairs of the Company, is ready for next step in the journey towards further prosperity and success in the development of the telephone industry in Japan.

History of the Development of the Telephone in Japan

The introduction of the telephone into the empire dates back to the year 1877, when a Japanese brought back from America a magneto telephone. The interest created by this new and wonderful machine gradually made itself felt; the first practical use of the telephone, so far as we have been able to discover, being made a few years later by the police department in Osaka, where circuits were constructed as long as thirty miles, and as many as ten instruments were connected in series on a single iron wire circuit.

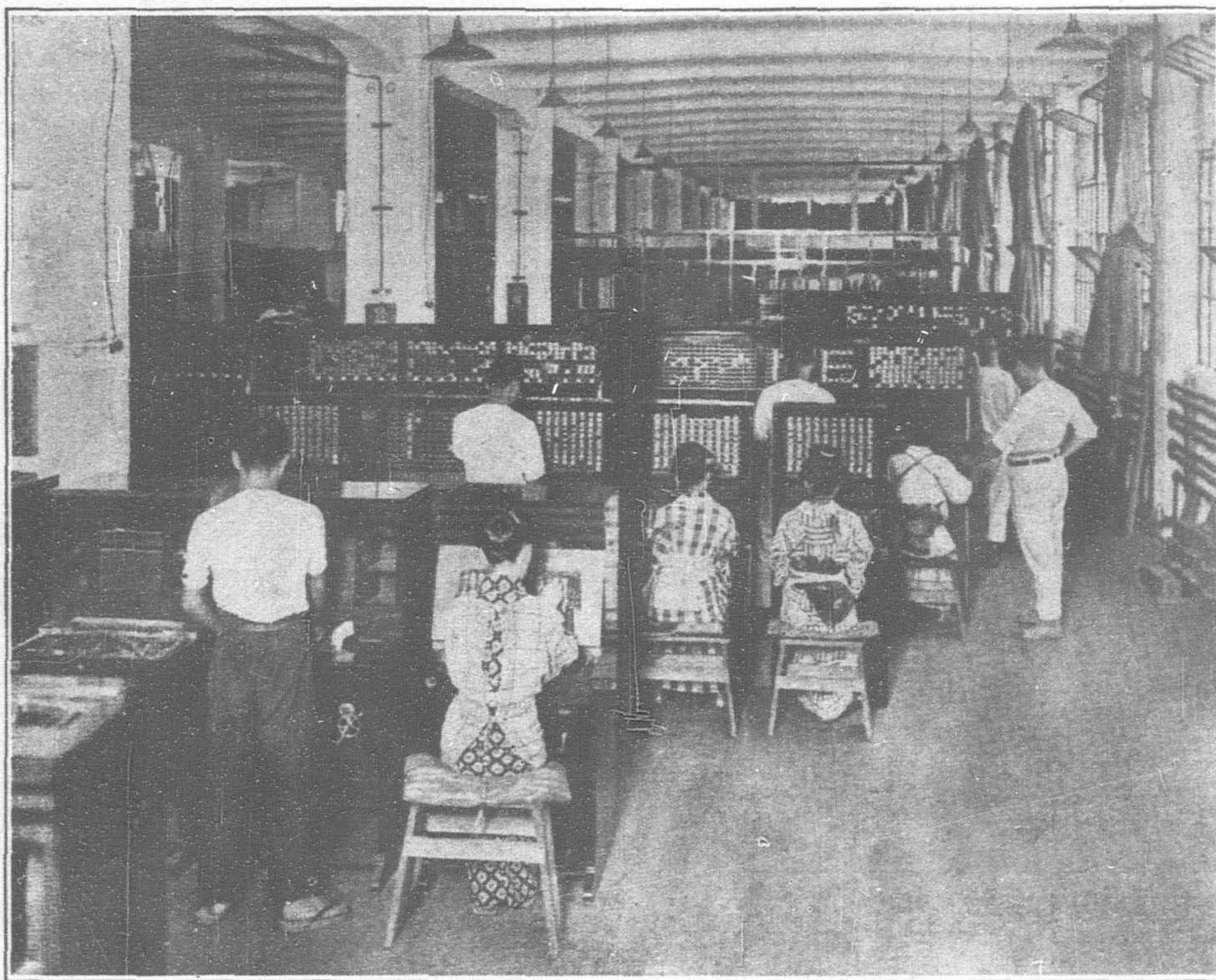
Encouraged by the success of this installation, a private company was formed in 1883 to exploit the telephone. It accomplished but little, however, and it was not until 1889, when the government decided to take over the telephone business as a government monopoly, that the development of the art began to make appreciable progress.

The occurrences leading up to this important step on the part of the national government take us back a year, to 1888. During that year Dr. S. Oi was

sent abroad by his government to study telephone and telegraph development. During the same year, Mr. K. Sawai was sent on a similar mission by the promoters of the private company. Mr. Sawai and Dr. Oi met in London and exchanged views on their observations and experiences. While they were together in London they received news from Japan that telephones and telegraphs were to be developed as a government monopoly. On the return trip to Japan, Mr. Sawai was unfortunately taken ill and Dr.



Mr. K. IWADARE,
Managing Director, Nippon Electric Company.



Nippon Electric Company: Switchboard Assembly

Oi was forced to carry the entire burden of the development of telephony for his government. He was subsequently placed in charge of the first telephone exchange in Japan, later became the first chief engineer of telegraphs and telephones, and is now a director of the Nippon Electric Company, Limited.

In the course of his travels through Europe and America Dr. Oi made the acquaintance of, and was greatly assisted by, Mr. H. B. Thayer, at that time manager of the Western Electric Company, New York, and now president of the American Telephone and Telegraph Company; Mr. J. J. Carty of the American Telephone and Telegraph Company; and Mr. F. R. Wells, manager for the Western Electric Company in Europe. From this visit dates the first connection of the Western Electric Company with Japanese telephone development.

Dr. Oi, on his return to Japan in 1889, brought with him the first Western Electric switchboard equipment used in Japan, a 100-line standard board, and three 240-line series multiple boards. With this equipment public telephone service was started. The Japanese, holding the same doubts as their American friends had held a few years previous, were inclined to look askance at this talking machine, and subscribers were not readily obtained. Statistics show that when telephone service was started in 1890, there were but 200 subscribers in Tokyo and forty in Yokohama. With this modest beginning, the telephone started to take hold; in 1895 there were nearly 3,000 subscribers' stations; in 1910, over 100,000, while to-day, in Japan and its possessions, there are 416,000 subscribers' stations, not including telephones connected through private exchanges.

The development of long-distance communication through open wire lines was carried on simultaneously with the development of local traffic. In 1888, experimental lines were installed

between Tokyo and Atami, a distance of about sixty-five miles, and in the following year between Tokyo and Shizuoka, the great tea centre, distant about 120 miles, using No. 12 S W G bare copper wire. In 1890, Tokyo and Yokohama, distant eighteen miles, and in 1899, Tokyo and Osaka, about 350 miles apart, were connected, and the lines opened to the public. Other important cities were connected as the development progressed.

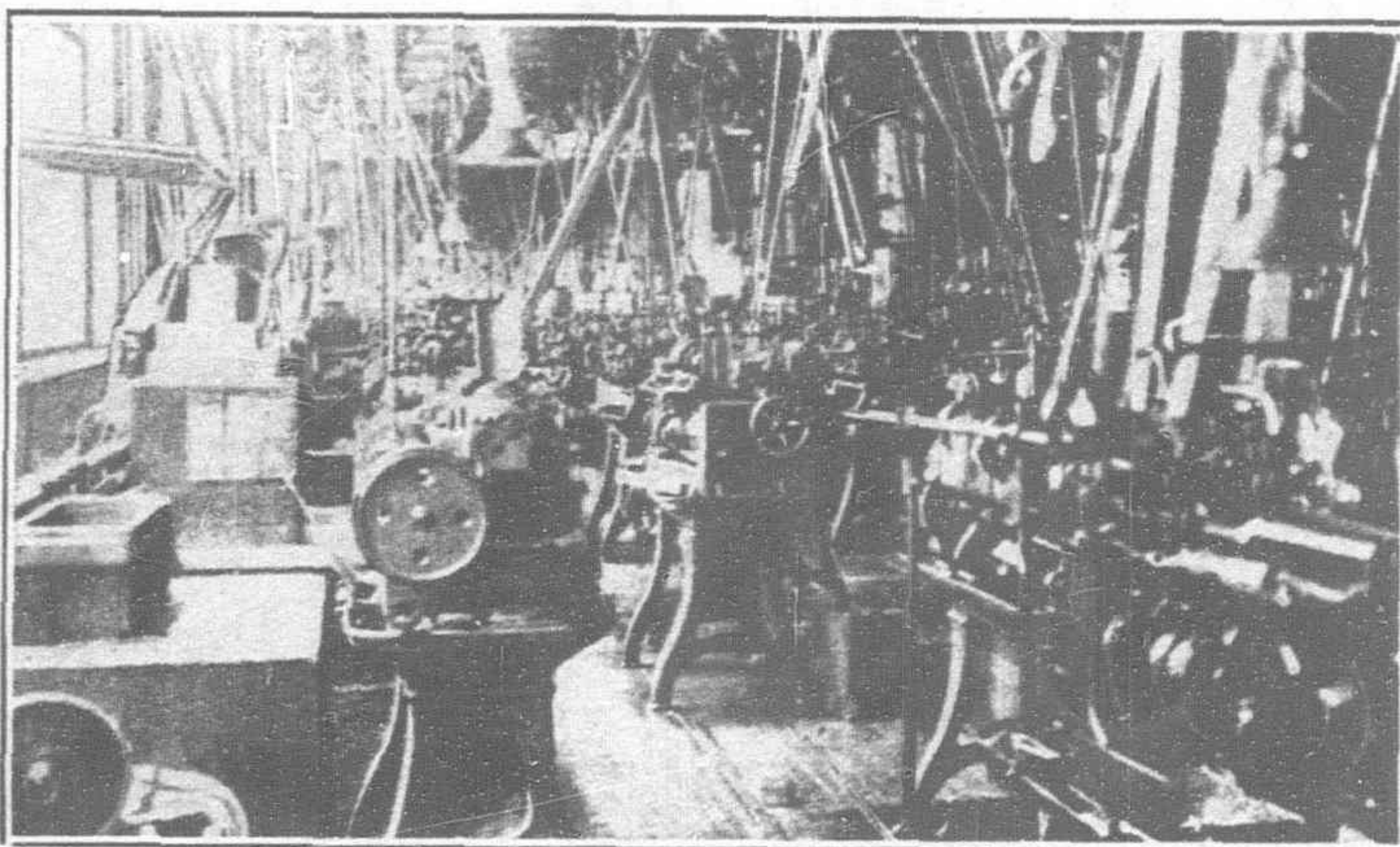
The first use of telephone cable came in 1897, when 25- and 50-pair aerial cable of the "Patterson" type and 100-pair underground cable, supplied by the Western Electric Company's Hawthorne factory, were installed in Tokyo for local subscribers' lines. Two years later, in 1899, 200-pair cable was installed in Tokyo and Osaka.

The first long-distance telephone cables were laid in 1922, between Tokyo and Yokohama, and between Kobe and Osaka, each cable being approximately twenty miles long.* Development of long-distance communication through cable is now being actively taken up by the government, and plans are under way for the installation of a loaded toll cable, containing 184 pairs of wires, to connect Tokyo and Osaka, the first two sections, comprising about sixty miles of cable, having already been manufactured and delivered to the government.

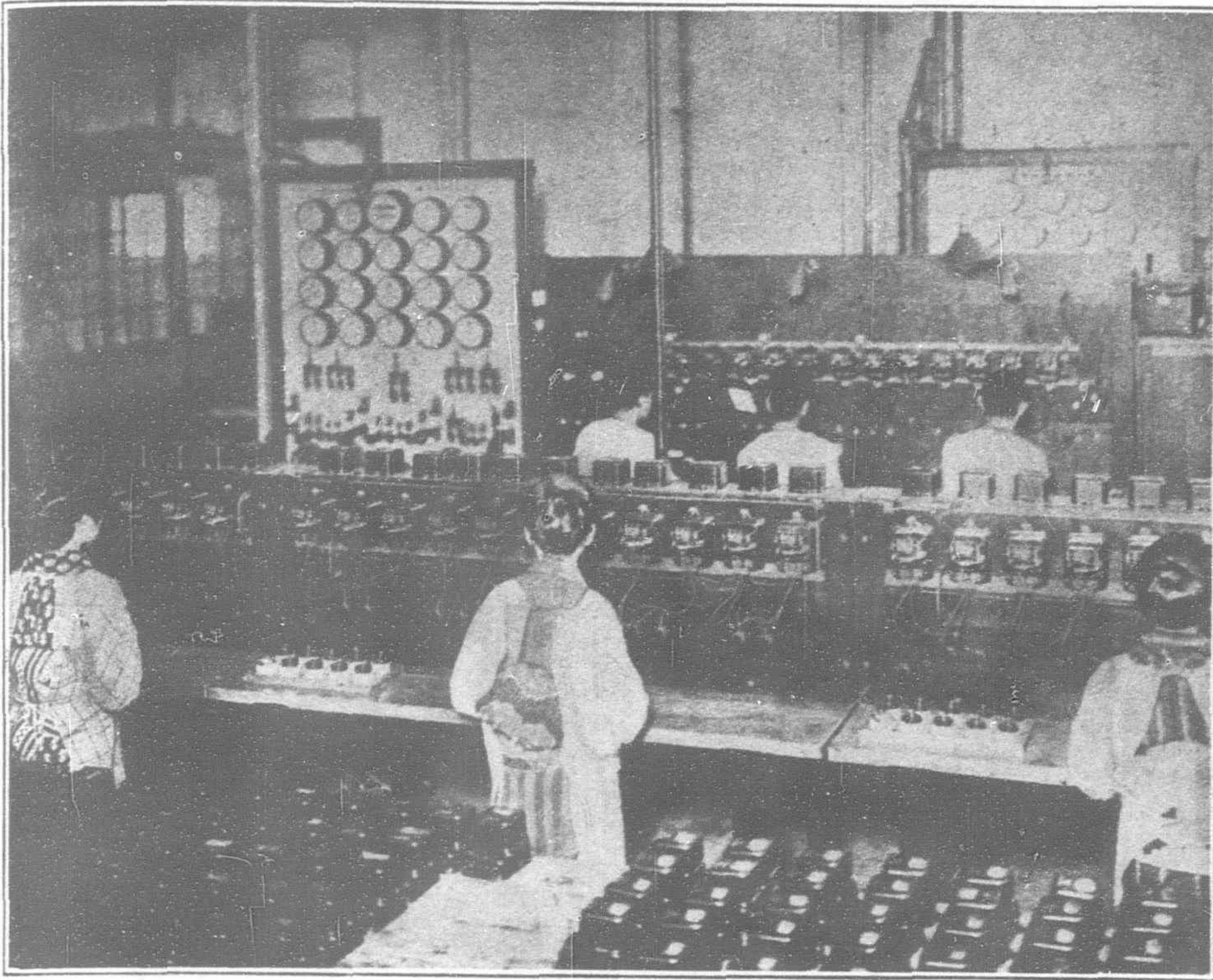
Thus for thirty years or more, the Nippon Electric Company has been the pioneer in assisting the government of Japan in the latest developments known to the telephone art.

In addition to standard telephone equipment and cable, Western Electric printing telegraph equipment is now in use by the government telegraph department, and Western Electric train despatching equipment is extensively used by the government railways.

*For description see Electrical Communication, February, 1923.



Nippon Electric Company: Telephone Assembly; Centre: Automatic Screw Department.



Nippon Electric Company: Watthourmeter Testing

Nippon Denki Kabushiki Kaisha

(Nippon Electric Company, Limited)

Keeping pace with, and in recent years somewhat ahead of, the development of the telephone in Japan, has been the work of this affiliated Japanese Company, whose history is one of steady progress.

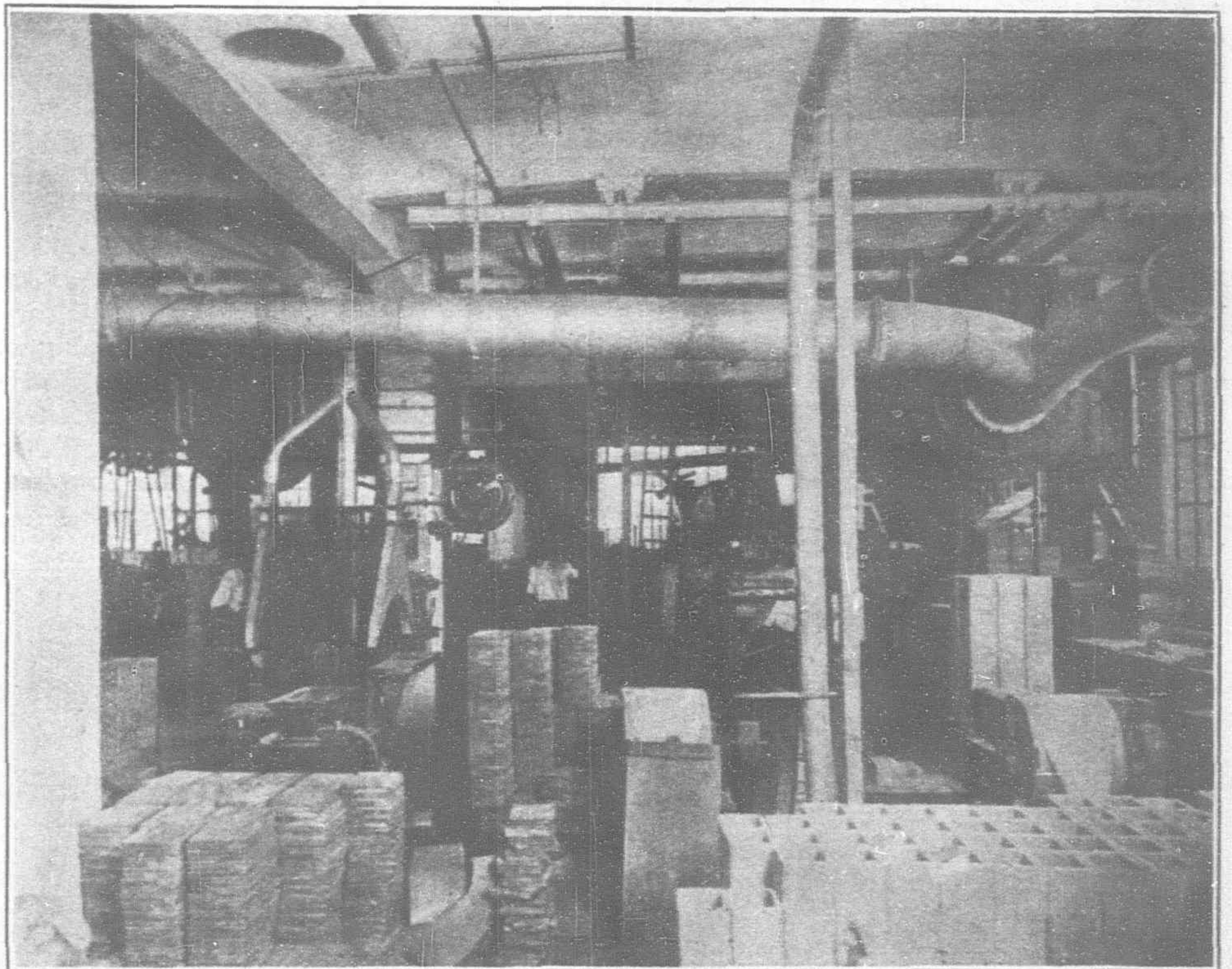
Prior to the year 1895, the Western Electric had been represented in Japan for three or four years by Takata & Company of Tokyo. During that time there was but very little telephone business, as the equipment then being used, standard switchboards and Gower-Bell type telephones with battery calling, were being made partly in the government shops and partly by local electrical factories. Early in the year 1895 Mr. Kunihiro Iwadare was appointed agent for the Western Electric Company in Japan, and one year later Mr. Thayer visited the country to investigate the possibilities of business. After Mr. Thayer's visit it was decided to make more permanent arrangements for handling the business in Japan, and in 1898 Mr. W. T. Carleton was sent to Tokyo to further the Company's interests as special representative.

On October 1, 1898 there was formed a limited partnership, the Nippon Denki Goshi Kaisha (Nippon Electric Limited Partnership) to handle the Western Electric agency, between Mr. Iwadare and Mr. Takeshiro Mayeda (who for many years was sales manager of the Nippon Electric Company). The capital subscribed by the partners was Y.50,000 (1 yen equals U. S. \$0.50 at par exchange) fully paid. Of the original capital, Y.40,000 was spent in buying up the plant of an old motor and generator factory. This plant consisted of thirteen small buildings, having about 28,000 square feet of floor space; a small power plant and about seventy-five machines, fifty of which were small lathes. With this equipment the Nippon Electric Company started its manufacturing career in Japan. In spite of its inadequacy, this purchase of a going concern enabled the Company to enter into immediate competition for some of the small telephone work which was being done at that time, and permitted much more rapid advancement than would otherwise have been possible.

On July 1, 1899, after the laws of Japan had been changed to permit of the investment of foreign capital in Japanese companies, the Nippon Denki Kabushiki Kaisha was formed with a capital stock of Y.200,000, fully paid. The promoters of the Company were Messrs. Kunihiro Iwadare, Takeshiro Mayeda, Rokuichiro Masujima, Yasusaburo Fukushima, Koreteru Fujii, Walter T. Carleton and Ernest W. Clement.

At the first meeting of the board of directors of the newly formed Company, Mr. Iwadare was elected managing director, in which position he has served for twenty-five years.

The first government budget for telephone extension had been started April 1, 1896, extending over a period of seven years. As the Japanese government had, in a large measure, adopted the approved practice of the American Telephone and Telegraph Company, the Nippon Electric Company received a substantial share of the orders placed, most of the apparatus sold being imported from America and Belgium, the principal work of the Company's shops being that of repair. The rapid growth in popularity of the telephone soon made it evident, however, that the original plan for the import of American- and European-made apparatus would have to be abandoned and that manufacture in Japan would be necessary in order to keep ahead of government demands and give satisfactory service.

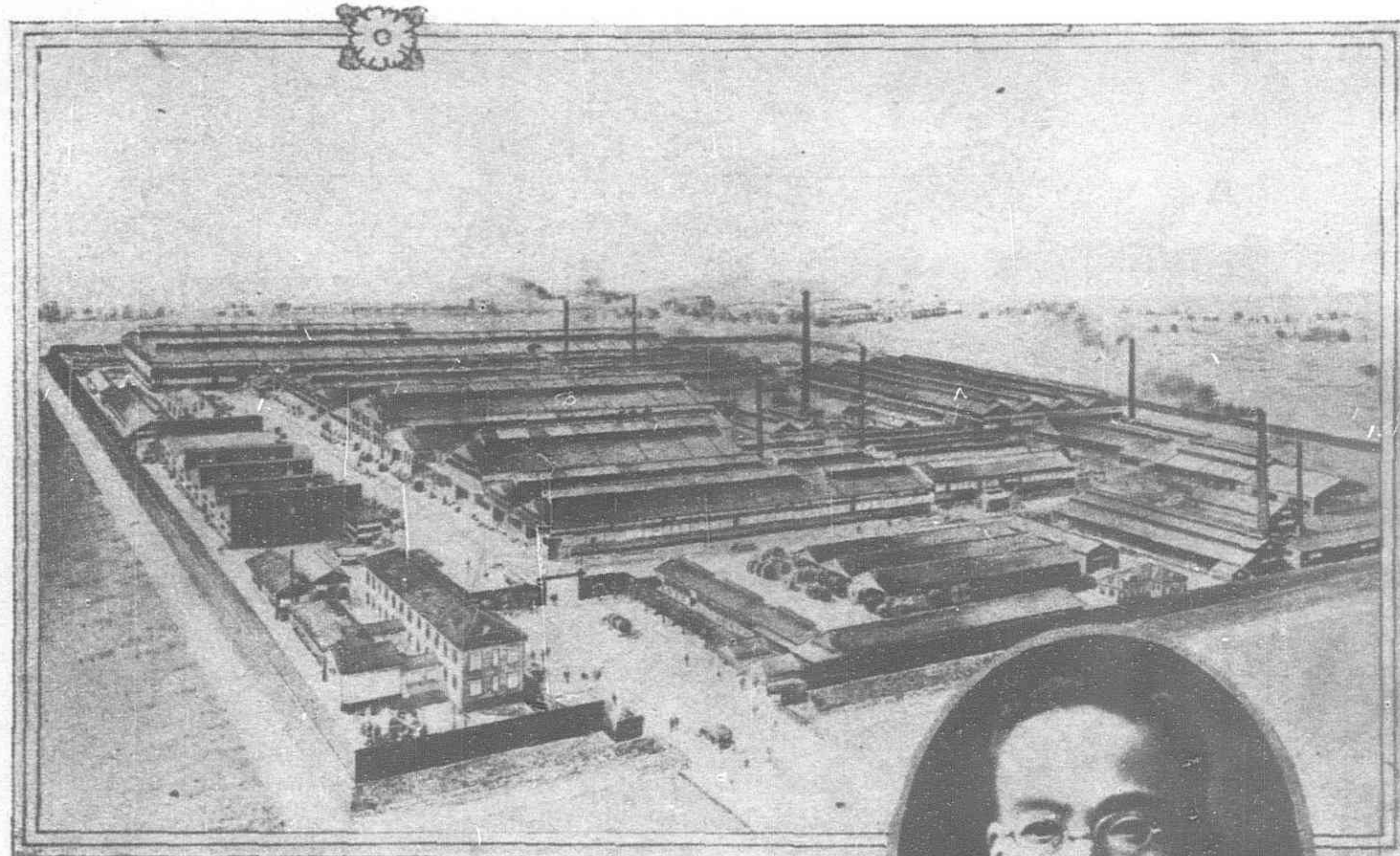


Nippon Electric Company: Carpenter Shop

Growth of the Business

Toward the latter part of the year 1899, 1,769 *tsubo* (1 *tsubo* equals 36 square feet) of land were acquired, and a number of new buildings were constructed, including a new office building, a warehouse, a one-story factory building and a boiler house. All of the early buildings were of brick and of earthquake-proof construction. A machine shop was laid out, a new power plant (35 h.p.) was purchased, and new up-to-date machinery installed. With the completion of this new plant the old buildings were sold and the lease of the original property was given up.

While the outbreak of the Russo-Japanese war resulted in the government deferring its program of telephone extension, the Company was very busy with orders for the army and navy. The



Sumitomo Electric Wire and Cable Works, Osaka: Baron K. Sumitomo, President



activities of the factory were further increased by orders from the Chinese government, which were very satisfactory in size. In 1905, the first branch office of the company was opened at Osaka, with Mr. M. Matsushiro, later general sales manager, as Osaka manager. In the same year more land (1,484 *tsubo*) was acquired for the Tokyo plant.

In 1906 the business of importing electrical supplies had reached important proportions, and this, added to the increase in local manufacture, created a need for more warehouse space. To meet this need, a second three-story warehouse was built. In the same year additional land (2,080 *tsubo*) was purchased and the capital of the Company was increased to Y.500,000. In the following year, in anticipation of an increase in the amount which the government would vote for telephone extension, a two-story brick factory building was constructed, having 14,000 square feet of floor space. Upon the completion of this building, in April 1907, the telephone assembly, testing and inspection departments, and the shop office, were moved out of the office building and located in the new factory building, as were also the wood-working, insulating and winding departments. That was fifteen years ago, when all the manufacturing activities of the Company were carried on in two buildings. To-day, the increased activities of the Company require about ten buildings for manufacturing purposes alone, and the combined floor space of all buildings has increased from 43,000 square feet in 1907, to 320,000 in 1922.

Commencing in 1907, with the second government telephone extension, the Nippon Company has grown very rapidly. The amount voted by the diet (Japanese house of representatives) for this extension was Y.20,000,000 over a six-year period, but further money was granted from time to time, and a considerably larger amount was spent. It must be understood that these amounts voted by the government for extensions covered not only the cost of apparatus, but all expenditures for telephone work, and the proportion allotted to the purchase of apparatus was not a large percentage of the whole.

The year 1907 proved to be an active year. As the need for more manufacturing space was becoming important a comprehensive study was made of conditions and requirements, and a definite plan adopted for the extension of the

Company's facilities. A new one-story brick "saw-tooth" roof building was erected on the new land which gave the Company about 10,000 square feet of additional floor space, and increased the total floor space to about 54,000 square feet. It was immediately put into use, all of the machine departments being moved in and the additional space thus made available made it possible to do away with a number of sheds which had previously been built.

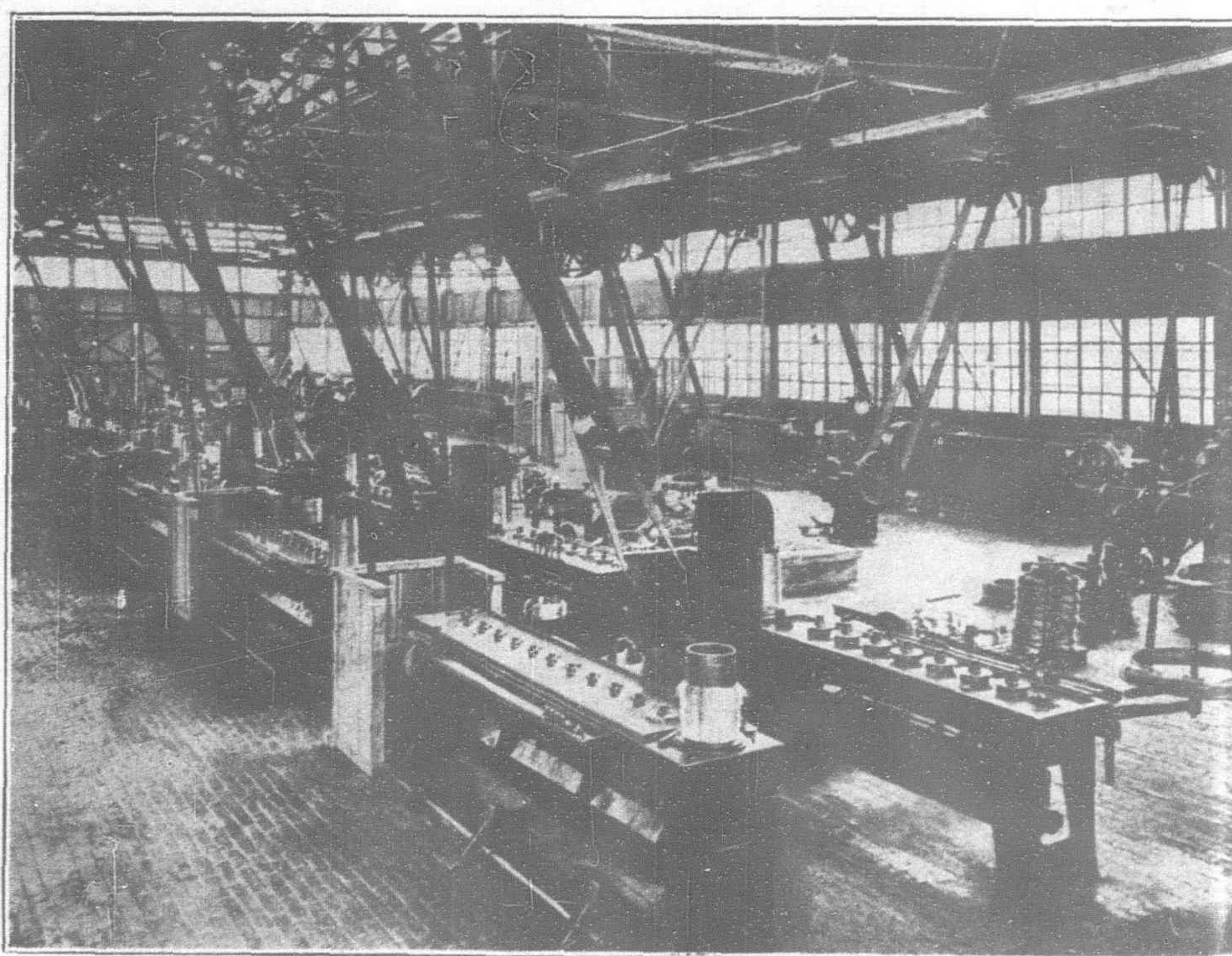
At this time the motive power of the factory machinery was changed from steam to electricity, the machines being operated by overhead shafting, which in turn were operated by electric motors, the new layout including the installation of a new 200 horse-power boiler and a 100-kilowatt generator set.

One more important step was taken during this year, namely, the opening of a second branch office in Seoul, the most important city in Korea.

During the period 1908 to 1911 the factories were very busy. The telephone business in Japan continued to grow, and it became necessary for the Company to further increase its manufacturing facilities. Up to this time many piece parts, as well as certain types of switchboards, had been purchased from America and Europe, but during the year 1911 practically all telephone apparatus was manufactured in Japan.

The capital stock had been again increased in 1909 to Y.1,000,000. In 1910 the second one-story "saw-tooth" factory building was started, increasing the total floor space of the plant to about 67,000 square feet. Additional boiler and generating equipment was purchased and this necessitated the building of a new steel earthquake-proof chimney, six feet in diameter and 123 feet high. In 1911 the third section of the new one-story factory was completed, a new one-story building was erected for the nickel-plating and polishing departments, and a blacksmith shop was completed. Local conditions at that time made it advisable to erect small buildings, and a number of them were built for various purposes, such as oil and varnish storage, wood drying, etc.

In 1910 the Company opened a third branch office, this time in Dairen, Manchuria. In 1911 Mr. Eisaburo Hata, a former government telephone engineer, who had for a time been Superintendent of the Yokohama Wire Works, was engaged as shop superintendent. During the next few years great improvements were made in the



Sumitomo Electric Wire and Cable Works: Wire Drawing Machines

factory, resulting in a much stronger organization than had hitherto been possible. About 1,300 *tsubo* of additional land were also purchased in preparation for future growth.

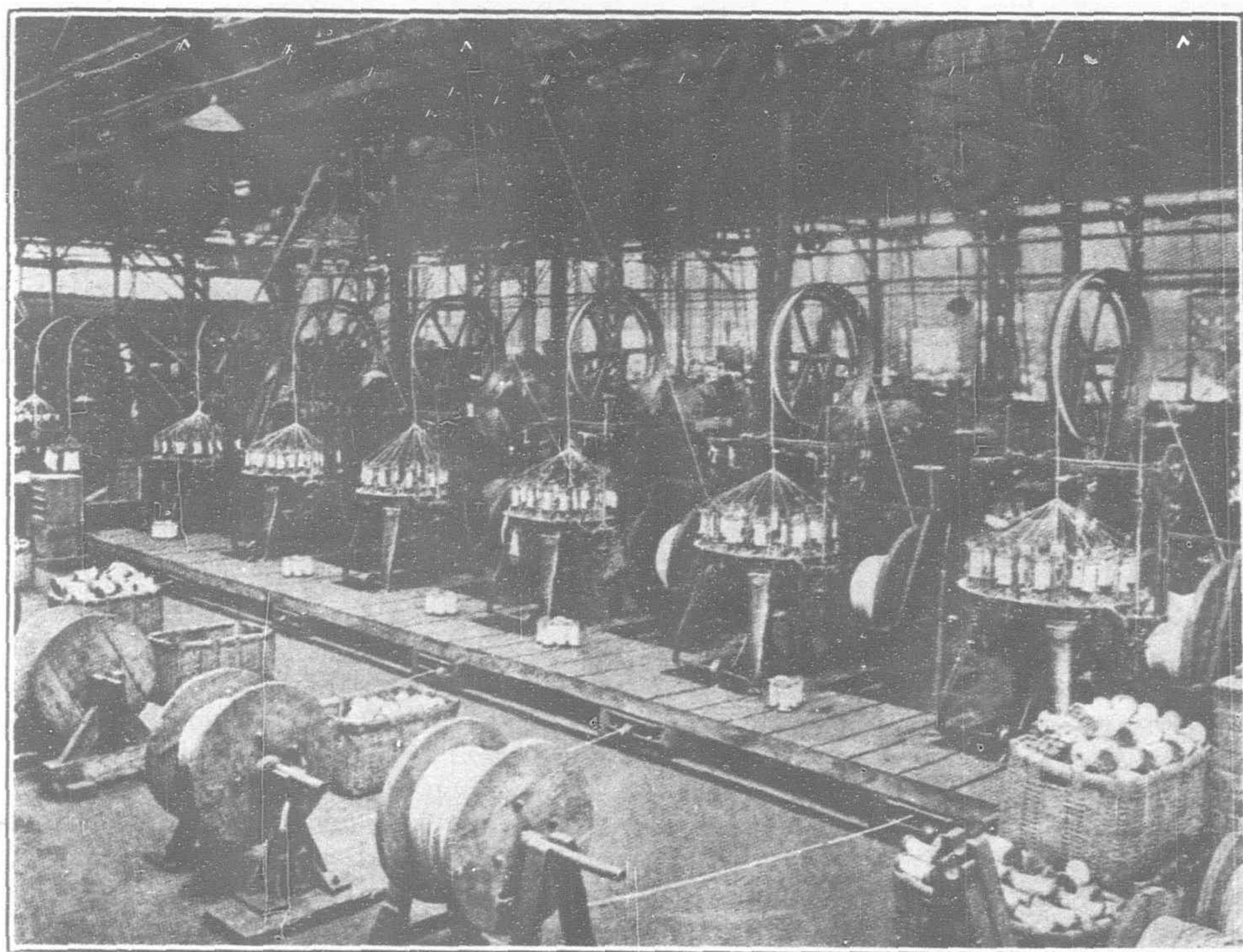
At this period it became evident that the amounts to be allotted by the government to telephone development would be appreciably increased, and in order to prepare for this increase in business which

In the fall of 1920, an important affiliation was made between the Nippon Electric Company and the house of Sumitomo, one of the oldest and strongest manufacturing, banking and commercial organizations in Japan. The existing wire and cable manufacturing plant, known as the Sumitomo Electric Wire and Cable Works, was incorporated as the Sumitomo Electric Wire and Cable Works, Limited, with a capital of Y.10,000,000. To this new Company, the Nippon Electric Company sold its lead cable manufacturing plant and granted certain patent rights, manufacturing information and assistance relating to the manufacture of wires and cables.

In order to give an idea of the size and stability of the Sumitomo organization, and an understanding of the great variety of enterprises guided, so wisely and efficiently, by Baron Sumitomo, it will be of interest to first take a bird's-eye view of the foundation and development of this vast organization.

In 1690 a copper mine was discovered in Japan in which the Sumitomo family became interested, and it was with this humble beginning that the cornerstone of a great business was laid. This mine was subsequently named the "Besshi Copper Mine" and for a number of generations the Sumitomo family devoted themselves largely to this enterprise.

The next step came two hundred years later when, due to the growing requirements of the mining business, there were formed sales, warehousing and banking companies to develop more actively these branches of the business. Thus there came into being the Sumitomo Copper Sales Company, the Sumitomo Bank, and the Sumitomo Warehouse Company, with offices in Tokyo, Osaka and Kobe. This was followed by



Sumitomo Electric Wire and Cable Works: Braiders

required additional buildings and machinery, the capital of the Company was increased (1912) to Y.2,000,000, of which Y.1,500,000 was immediately paid up. Following this, work was started on the plans for a new two-story factory building, the sixth factory, to be constructed of reinforced concrete. This building was one of the first reinforced concrete factory buildings erected in Japan. The building was completed in 1913 and provided over 30,000 square feet of additional floor space for manufacturing and offices.

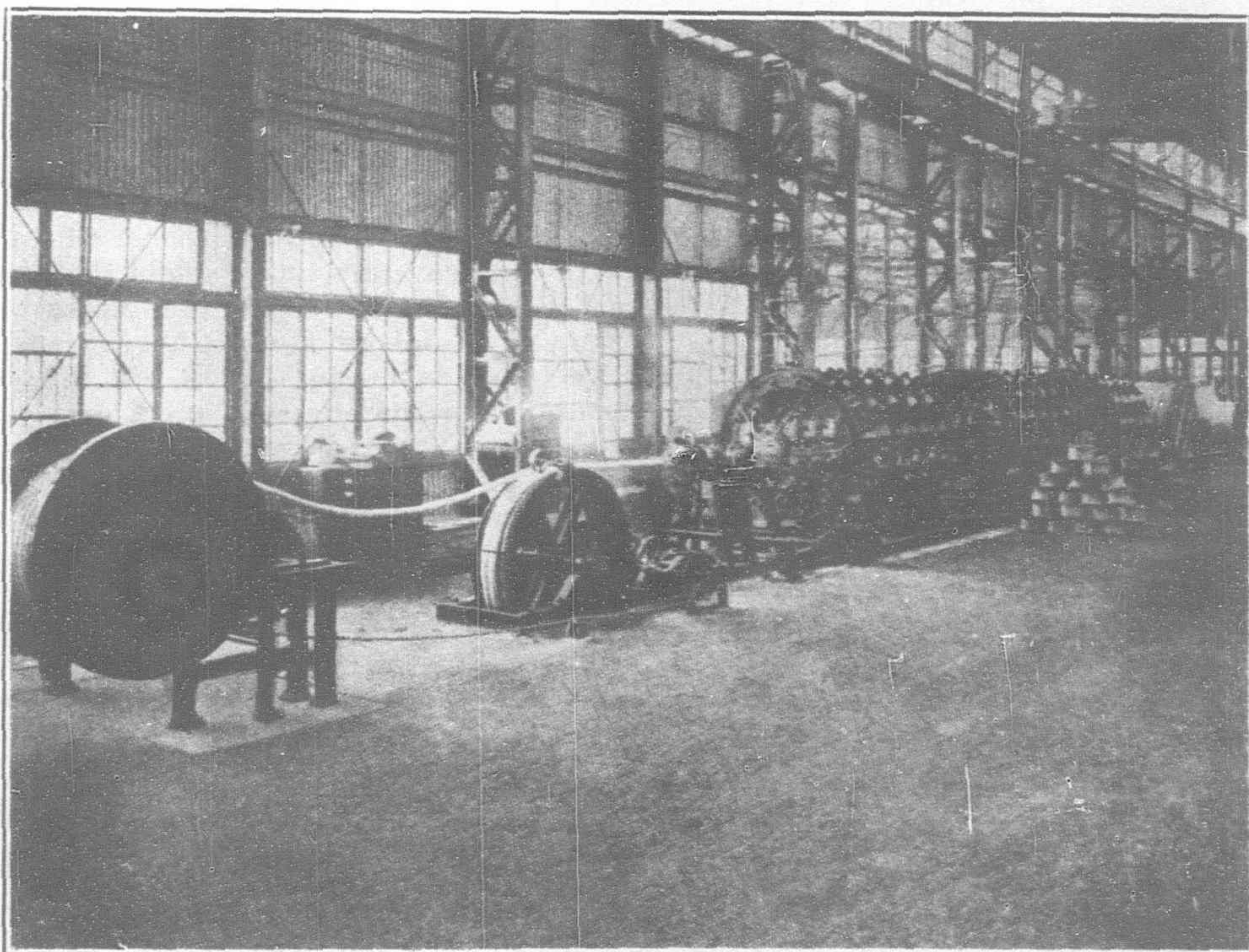
In 1913 a new department was started for the manufacture of telephone condensers; and in 1914 a complete plant was installed for the manufacture of paper-insulated lead-covered cable. In the same year the manufacture of "Meggers" and watt-hourmeters was started.

In 1917 the capital of the Company was increased to Y.2,500,000; at the same time the employees of the Company were given an opportunity to purchase capital stock, and the Mitsui Bussan Kaisha, one of the largest and oldest banking and trading industries in Japan, became a stockholder.

October of the same year witnessed the incorporation of the China Electric Company, Limited, a joint Chinese government, Nippon Electric and Western Electric enterprise. This Company took over the business of the Nippon Company in China, and started the manufacture of certain telephone equipment.

In 1918 the capital of the Nippon Electric Company was increased to Y.5,000,000, and in 1919 a new three-story, reinforced concrete building was erected, providing about 40,000 square feet of additional floor space. This was the first three-story factory building erected by the Company.

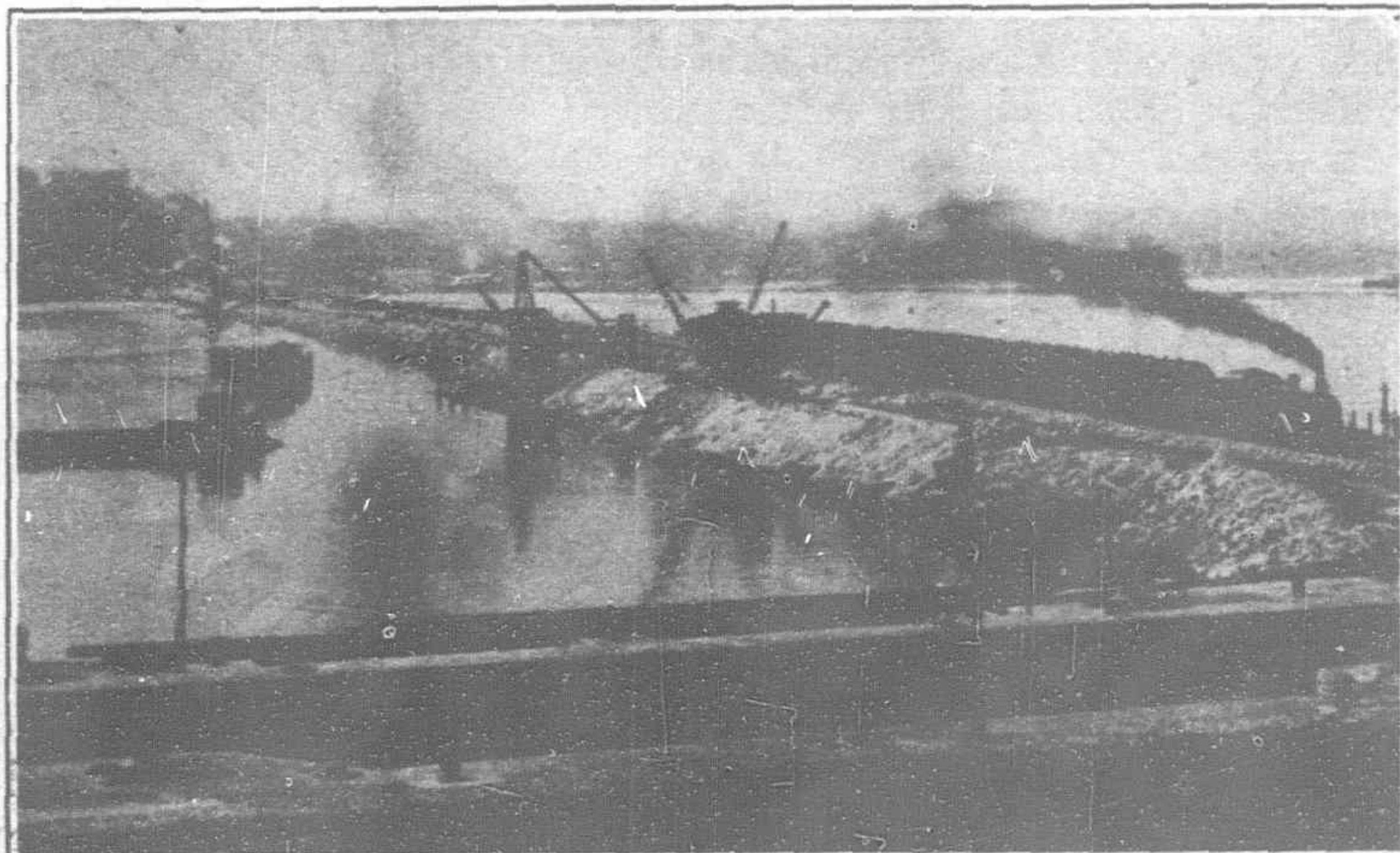
In 1920 machinery was installed for the manufacture of black enamelled wire and switchboard lamps and the capital was increased to Y.10,000,000, full payment being completed early in 1923.



Sumitomo Electric Wire and Cable Works: Cable Making Machinery

the organization of the Sumitomo Copper Works, formed to manufacture plates, sheets, tubes, rods, bars, etc.; the Sumitomo Steel Works, the first steel fabricating company in Japan, comprising a large plant manufacturing a broad line of forgings and castings; the Sumitomo Fertilizer Works, which utilizes certain by-products of the copper mine; the Sumitomo Wakamatsu coal department, distributing the bituminous coal output of the Sumitomo mines; and the Sumitomo Electric Wire and Cable

(Continued on page 66).



The Completed Johore Causeway Linking Singapore Island with the Mainland : The First Train

The Johore Causeway

IN the July 1923 number of THE FAR EASTERN REVIEW was published a paper read by Mr. D. Paterson, M. inst. C.E., before the Engineers Association of Malaya on the Johore Causeway. Since then, the work has been completed, and formally opened at the beginning of October. The causeway connects the island of Singapore with the state of Johore, which forms the southernmost point of the Malay peninsula, and is one of the greatest engineering works that have been undertaken in the Far East.

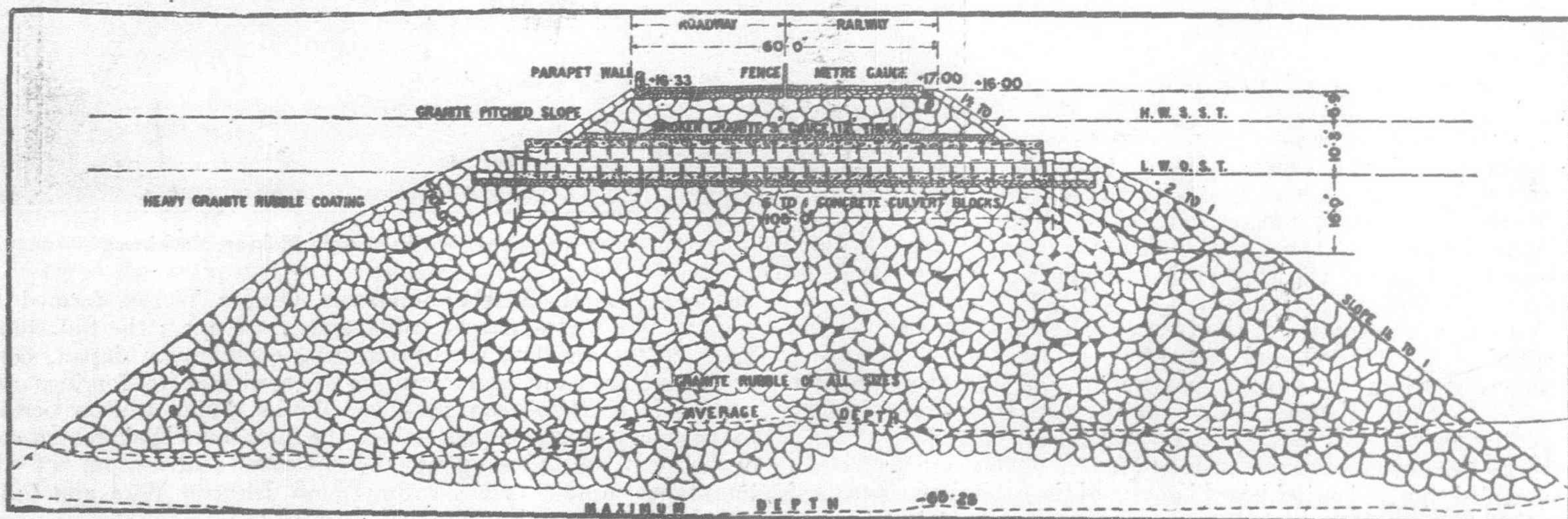
The following additional information from *The Engineer* will supplement the technical description in our issue of last July:—

The causeway, which crosses the straits of Johore linking up the island of Singapore with the mainland, is formed on a rubble mound which is 3,465-ft. in length. When completed, the causeway will be 60-ft. wide at the top and will carry two lines of railway and a roadway 26-ft. wide. Its construction became necessary for the following reasons. The railway across the island of Singapore connecting the town and port with the straits of Johore was opened for traffic in 1903. It was originally built by the government of the Straits Settlements but was subsequently purchased by the government of the Federated Malay States. The Johore state railway, which was built at the cost of the state of Johore by the Federated Malay States railway department, and is now leased by the latter, was opened in 1909, and at the same time a wagon ferry service between the two railway termini—Johore Bahru and Woodlands—which face one another across the straits, was brought into use, the ferry boats carrying six goods wagons at a time. While, however, goods were carried from the island to the mainland, and *vice versa*, without transshipment, the passenger traffic was,

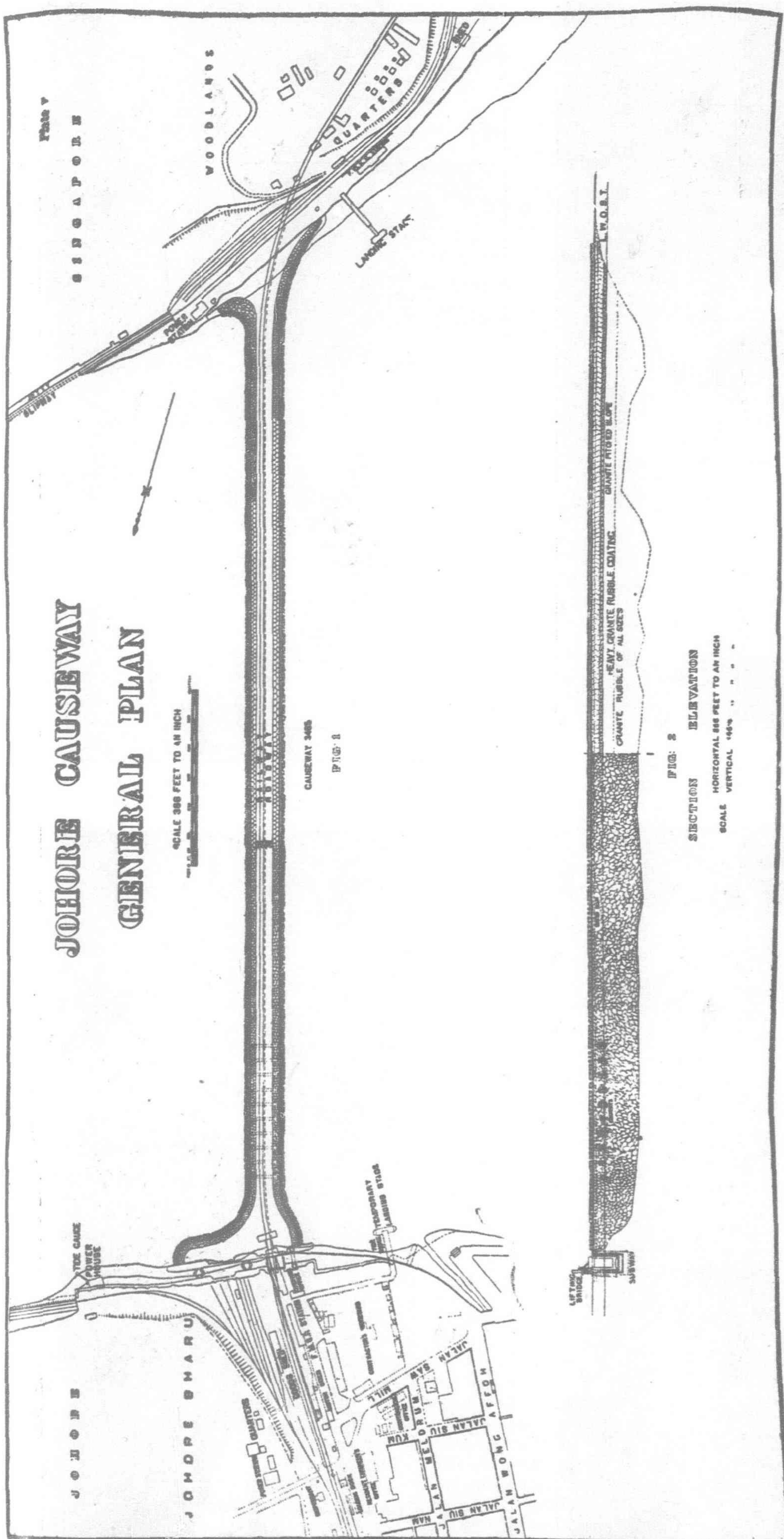
until the opening of the causeway, effected by means of launches. A train ferry service had been considered but, at the time, it was thought that the expense of installing it would not be justifiable.

In July, 1918, the railway system of the Federated Malay Straits was connected with that of Siam and, since the Johore state railway joins up with the former, it then became possible to travel direct from Johore to Bangkok without change of carriage. The advantages which would accrue from filling up the gap between the island of Singapore and the mainland so that there might be direct railway connection from Singapore town not only with the F.M.S. but also with the capital of Siam then became more than ever evident. The question was of enhanced importance in view of the considerable growth in the goods traffic which had taken place since the wagon ferry had been instituted in 1909. In 1911 11,500 wagons were transported over the straits. By 1917 the number had increased to 54,000—which, at six wagons a time, represents an average of more than one trip per hour continuously. The number increased to 58,402 in 1921, and it was only by working day and night that the boats were able to cope with the traffic.

Moreover, everything at that time pointed to an increase in the rubber traffic, and on the recommendation of Mr. P. A. Anthony, M. inst. C.E., the general manager of the F.M.S. railways, the government decided that something must be done to furnish increased transport facilities, and several schemes were considered. The first suggestion was that a bridge should be constructed, but it was negatived for several reasons. In the first place investigations showed that the available foundations were not satisfactory. The average depth of water on the line which the bridge would have to take is 46-ft. at low tide, and in some places it is as much as 70-ft.



Johore Causeway : Typical Cross Section



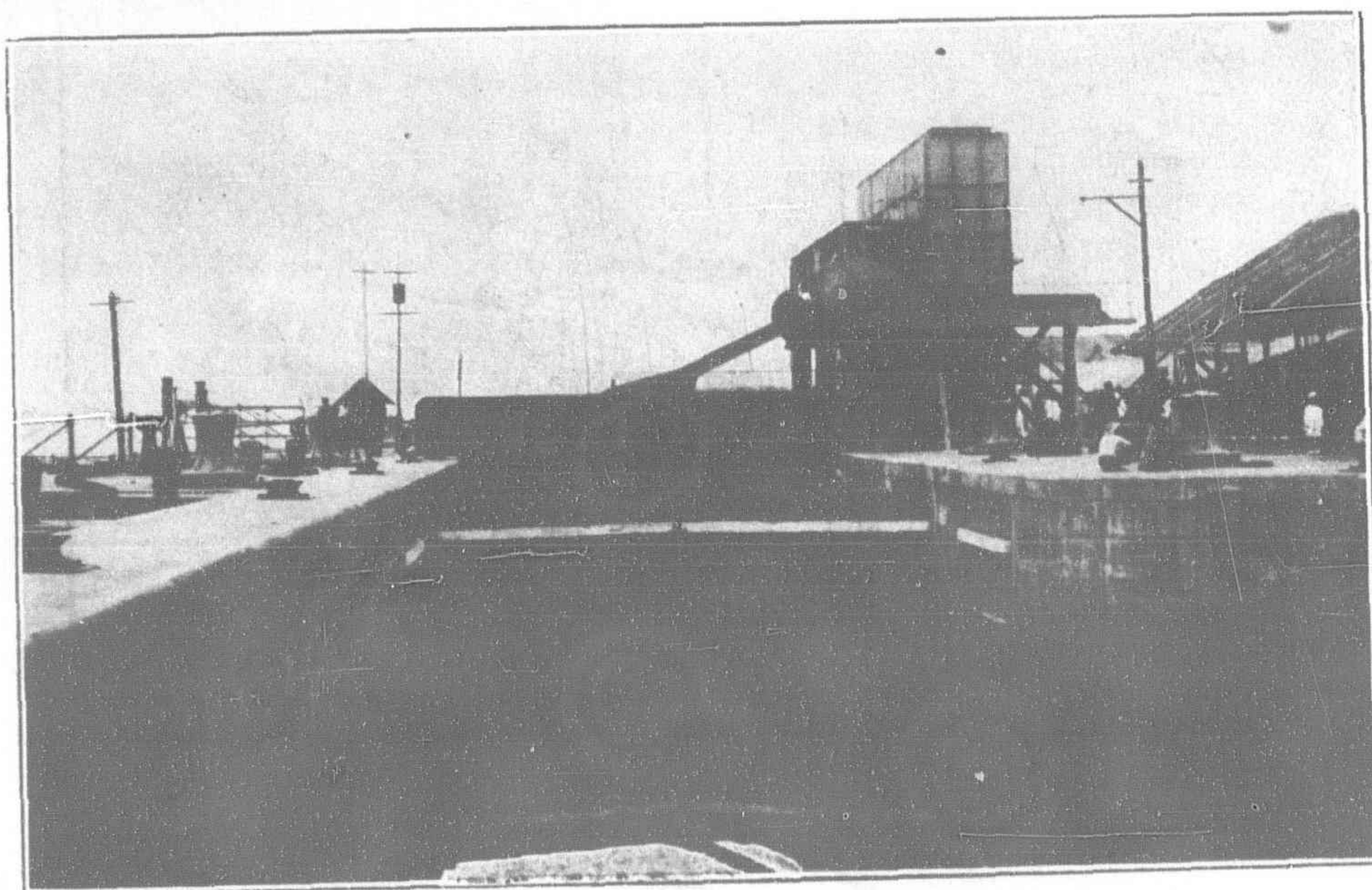
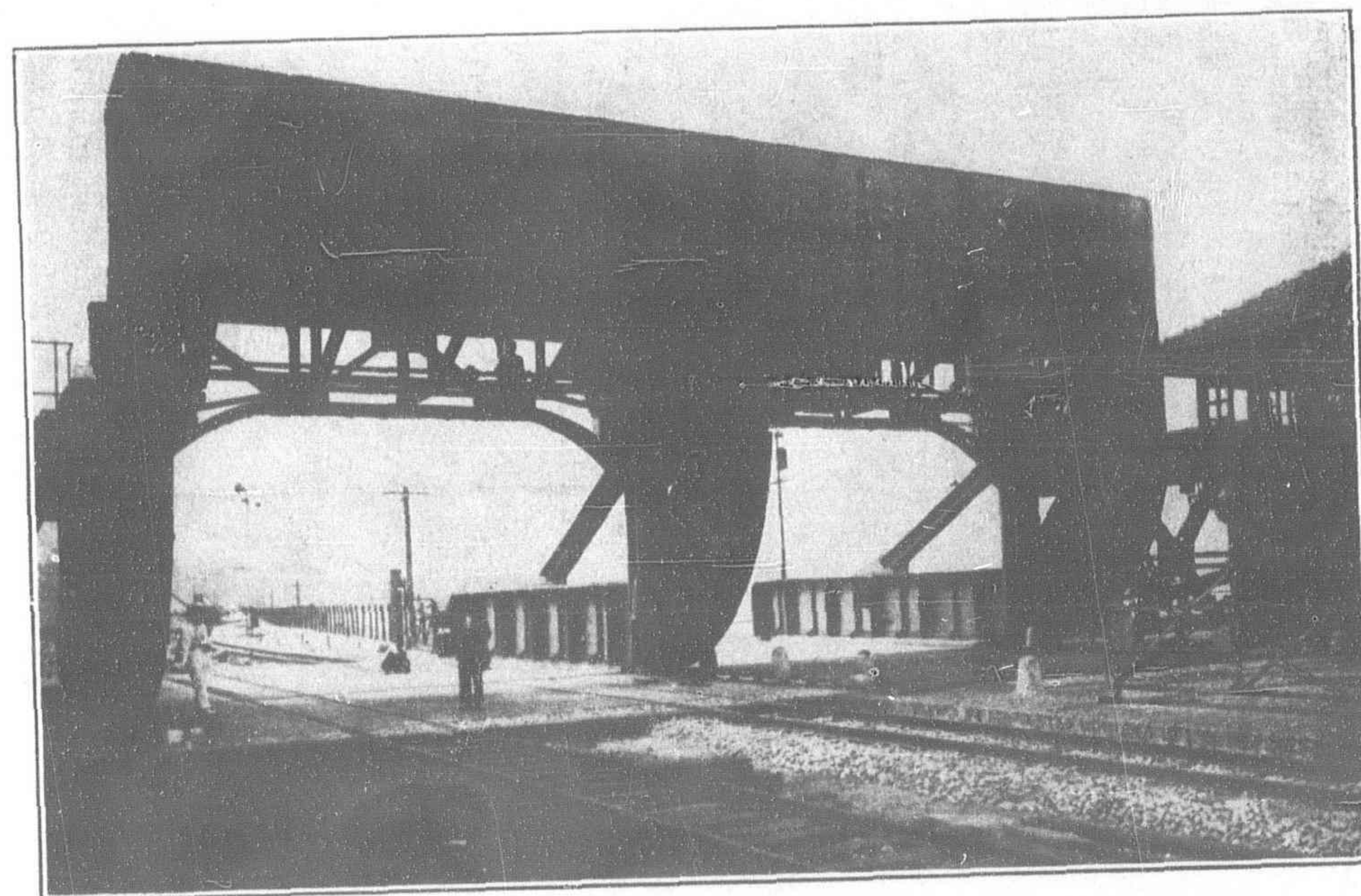
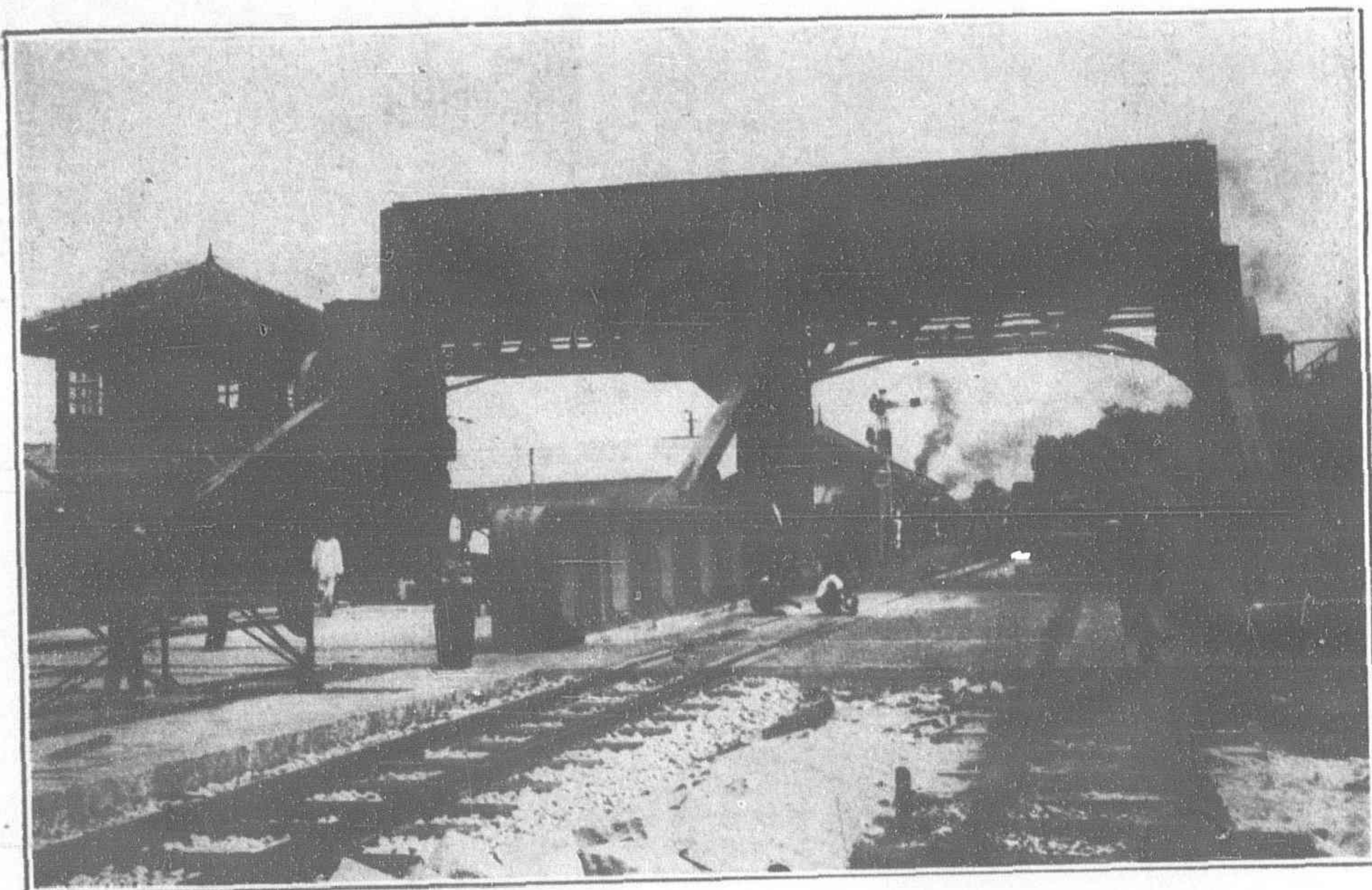
Then, again, a bridge, if constructed, would have entailed considerable expense in maintenance, and it would have had to be provided with an opening span. The first proposal to make a rubble causeway was made by Mr. W. Eyre-Kenny, M. Inst. C.E., who was at that time director of public works in the Federated Malay States, and eventually it was decided to construct a causeway from designs prepared by Messrs. Coods, Fitzmaurice, Wilson and Mitchell, of Westminster, who were called in as consulting engineers. A potent factor in the decision was that a causeway when once constructed would cost less to maintain than would a bridge.

The causeway is being formed on a mound of stone rubble, the material for which is being quarried at Bukit Timah, in the island of Singapore, and on the small island of Pulau Ubin, which lies some 16 miles away in the eastern entrance to the straits of Johore. The greater portion of the mound consists of granite rubble of all sizes up to 5 tons, which was deposited exactly as it comes from the quarry. On each side of the bank commencing at 15-ft. below low water of spring tides a coating 10-ft. thick of heavy rubble, ranging in weight from 5 tons down to $\frac{1}{2}$ ton, was deposited and finished off to a slope of 2 to 1. This coating was taken up to a height of 4-ft. above L.W.O.S.T., and its upper surface was brought up to form a berm so as to provide against possible displacement of the upper portion of the work by wave action. Blocks of 6 to 1 concrete were laid at the back of the berm to form a toe for the granite rubble pitching, which was laid to a slope of $1\frac{1}{2}$ to 1 on the upper slopes of the causeway. The rubble was brought to the site in 300-ton hopper barges with opening bottoms, which were towed from the quarry by tugs and then moored in position by ropes attached to moorings. The depositing of stone in this manner was carried on from both ends, and when the channel had been narrowed down to about 1,000-ft., it was found that the currents through the opening were about 5 miles per hour. Stone was then deposited all over the channel but not up to such a height as to interfere with navigation until the lock was ready for the passage of vessels. When the mound had been raised as high as was practical by deposition, short lengths, sufficient to permit of the erection of a derrick crane were built up by a floating crane. The building of the superstructure was then effected by means of the derrick crane. The maximum quantity of stone deposited in any one month was 55,000 cubic yards. The roadway consists of a bed of 9-in. of granite rubble closely packed on edge with a 6-in. layer of granite metalling on the top. It is calculated that when the causeway is completed it will contain over $1\frac{1}{2}$ million cubic yards of stone.

A disadvantage of a structure of this kind is that it blocks the straits, and special provision has to be made for the passage of craft from one side of it to the other. To get over this difficulty a lock has been formed in the mole at the Johore end. As a matter of fact, though there is deep water at the eastern end of the straits—

THE ROLLING LIFT BRIDGE OVER THE JOHORE CAUSEWAY

Built by Sir William Arrol & Company, Ltd., of Kilmarnock



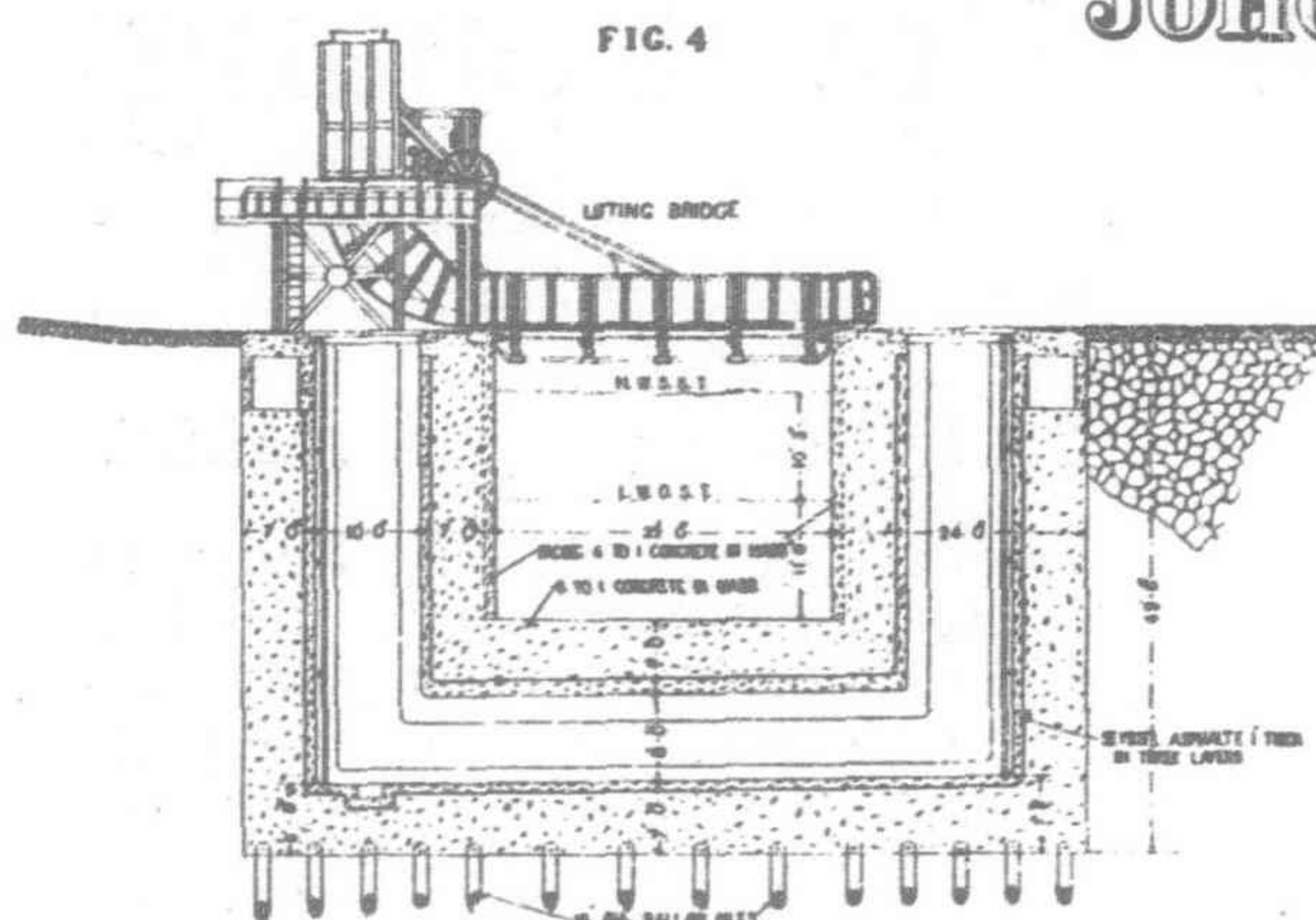
JOHORE CAUSEWAY

Plate vii

FIG. 4

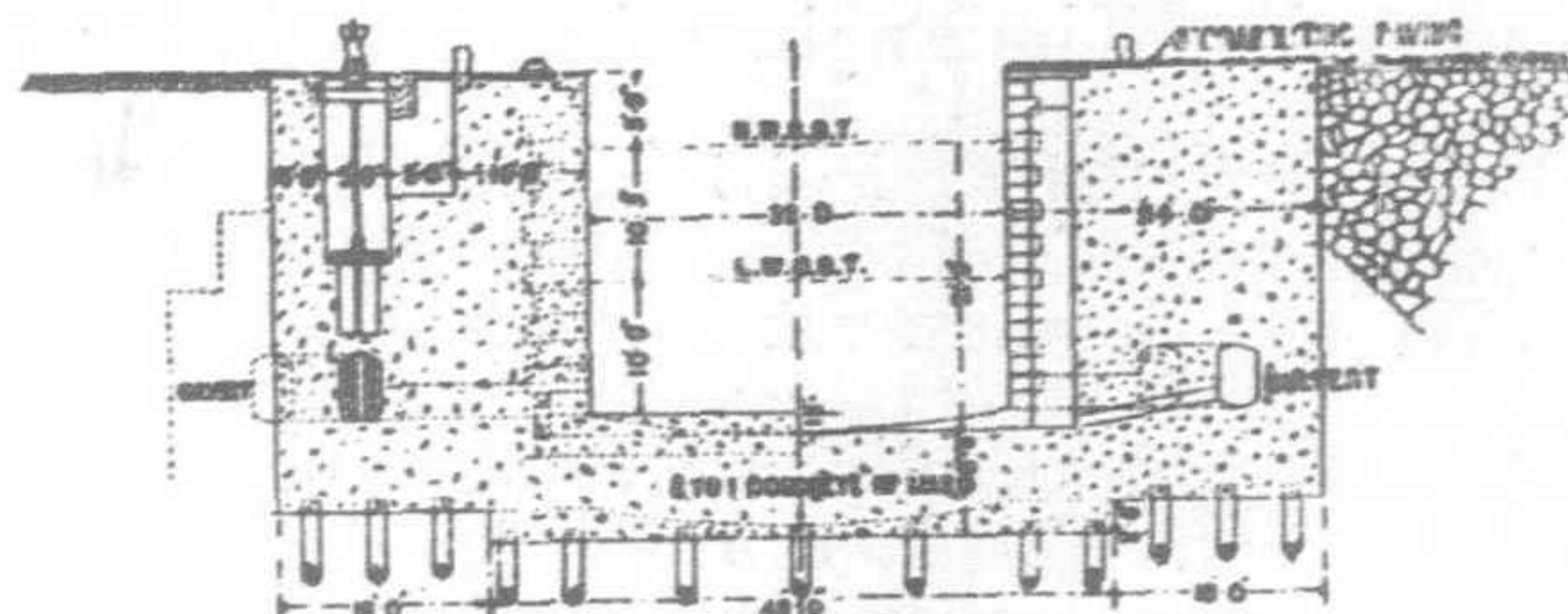
LOCK & WING WALLS

SCALE 30 FT. TO 1 IN. HORIZ. 10 FT. TO 1 IN. VERT.



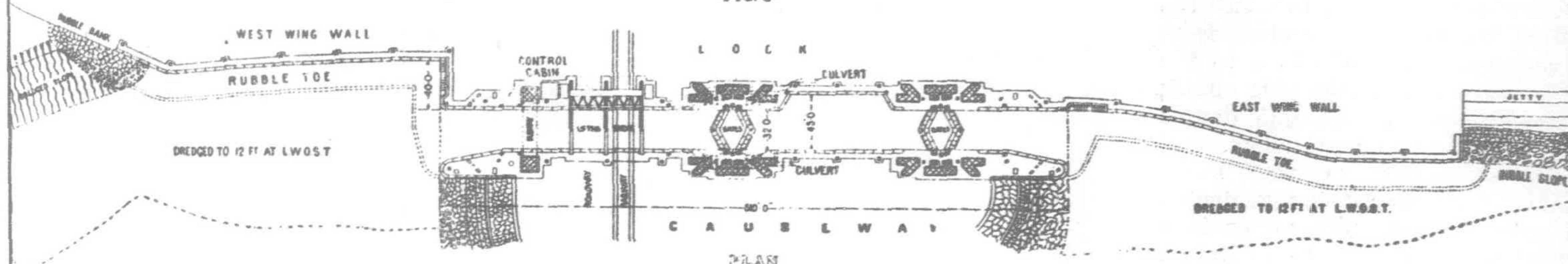
SECTION THIRD SUBWAY

FIG. 5



SECTION THIRD CENTRE OF LOCK

FIG. 6



PLAN

where, by the way, it is proposed to establish the new British naval base—the western end is shallow and can only be used by small vessels. It was not necessary, therefore, that the lock should be of any great size. Actually, it has been made 170-ft. long between the gates by 32-ft. wide at the gates, though it is widened out to 45-ft. for a certain portion of its mid-length, so as to allow of a number of boats entering it at the same time. It has been furnished with a double set of gates since, owing to the tides, the flow of water changes in direction. The depth of water on the sills at low tide is 10-ft. For the regulation of the water level in the lock a culvert, 5-ft. high by 3-ft. wide, is provided in each side wall, and water is admitted into or released from the lock by means of hand-operated cast iron sluices which are furnished with gun-metal faces. From the culverts there are five openings, 2-ft. 6-in. by 2-ft., through each side wall. In each of the recesses into which the gates swing there are also three outlets 1-ft. in diameter, which are for the purpose of flushing out deposits of silt. The lock gates are of steel. They are 24-ft. in height by 20-ft. long and 3-ft. 6-in. wide at the centre, and are divided into seven decks. The outer plates are curved to a radius of 22-ft. The gates are operated by hand-worked capstans, each leaf having hinged to it a steel joist which has attached to it a cast steel rack. The lock has been open for traffic since January of this year.

With the lock cutting across the causeway it was, of course, necessary to have some means of spanning the former, which could be taken away so as to permit of the passage of vessels. A bridge of the rolling lift type was chosen, and its construction was entrusted to Sir William Arrol & Co., Limited, of Kilmarnock. It is the first of its kind to be erected in the Straits Settlements. The moving part of the bridge weighs 570 tons, and it is operated electrically by a 35 horse-power motor, hand gear being also fitted for use in case of breakdown or failure of the electric current. It is estimated that against a fresh breeze it will take 3½ minutes to lift the bridge by power as compared with 19 minutes with four men. The structure has a clear span of 32-ft. and is 57-ft. wide. It is composed of three main plate girders, 38-ft. long and 5-ft. deep, with cross girders, spaced 7-ft. apart, to which are attached the longitudinal rail bearers and the floor troughing. At the rear end of the main girders are attached segmental girders curved to a radius of 14-ft. 1½-in., which carry the ballast box. The latter, which extends for the full width of the bridge, measures 9-ft. by 7-ft. 6-in. The ballast consists of concrete

and pig iron. The segmental girders rest on level track girders, which are carried on beam grillages anchored into the solid concrete of the dock wall, the whole being concreted up to the level of the track girders. The length of roll of the bridge is 20-ft., and the track plates have projections 6-in. by 3-in. by 2-in. high, which engage with slots in the segmental girders to prevent any motion of the bridge except rolling motion. The power for operating the bridge is transmitted from the motor through gearing to operating pinions at the centres of the rolling segments at each side of the bridge. These pinions engage in two cast steel spur racks which are bolted to girders carried on trestles, which are, in their turn, bolted to the bridge abutments.

In order to obtain railway communication across the straits at the earliest date possible, the making of the roadway portion of the causeway was undertaken first. As soon as a half width bank was completed, a temporary single track was laid over which the traffic was conducted, while the remainder of the bank was being completed and the permanent rails laid. The reason for this procedure was that, if the railway portion had been constructed first, the roadway portion would have been cut off from the Pulau Ubin quarry, unless the barges carrying the stone were passed through the lock, which would have meant the wasting of a good deal of time and have caused much inconvenience.

At the moment of writing we do not know what effect, if any, the causeway has had upon the general conditions in the straits. The complete closing of the channel has, of course, interfered with the natural flow of the tides, and it will be interesting to see whether there will be any untoward consequences. It was anticipated, that unless precautions were taken to prevent it, there might be an accumulation of floating refuse against the causeway at the Johore end, and therefore ten circular culverts, each 5-ft. in diameter, have been formed from side to side through the structure near the lock, with their inverts at L.W.O.S.T.

It is intended to take advantage of the construction of the causeway to lay on the latter the pipe line which is to convey to Singapore the new water supply from the Pulau reservation. In order to lead the pipe line past the lock a subway 11-ft. 6-in. wide and 8-ft. high has been formed.

The contract for the whole of the works was given to Topham, Jones and Raillin, Limited, of London, and operations were begun

(Continued on page 95).

Electrical Equipment of the Penang Hills Railways

Paper Read Before The Engineering Association of Malaya, Dec. 16, 1923, By Thomas Rogers, A.M.I.E.E.

THE Penang Hills Railway is divided into two sections and may for all purposes of operation be considered as two distinct and independent lines, the top section being a complete duplicate of the lower section in so far as the electrical equipment, telephones and signalling systems are concerned. Therefore in the remainder of this paper I shall only consider one section, the other can be understood as a complete duplicate.

The makers of the switchboard, motors and controller equipment are the British Thompson Houston Co. and the makers of the brake solenoids are Messrs. George Ellison & Sons.

The switchboard consists of a main double pole switch to which the incoming mains are connected, from this connection are led direct to the top contacts of a double pole circuit breaker, thence through one double pole switch to the controllers, and through a second to the brake solenoids, the latter being protected by a pair of fuses. The motor is a standard B.T.H. D.C. motor of 75 h.p. and fitted with interpoles.

There are two controllers, the first is used to control the direction of the motor, by changing the connections to forward or reverse as may be required, the second controller is the power or operating controller, and when moved forward controls the supply to the motor and therefore its speed, this controller can also be used for braking, by simply reversing its motion from forward to reverse and it is this brake which is used for controlling the speed of the train when the load going down is heavier than the load coming up.

Braking

This is perhaps the most important part of the whole equipment

and is entirely independent of any braking equipment fitted on the cars themselves, except that should any unauthorized person apply the brakes on the cars, then it would be impossible to operate the motor as the overload protection would operate tripping out the circuit breaker every time the driver attempted to use his controller.

The brakes in the engine room are four in number

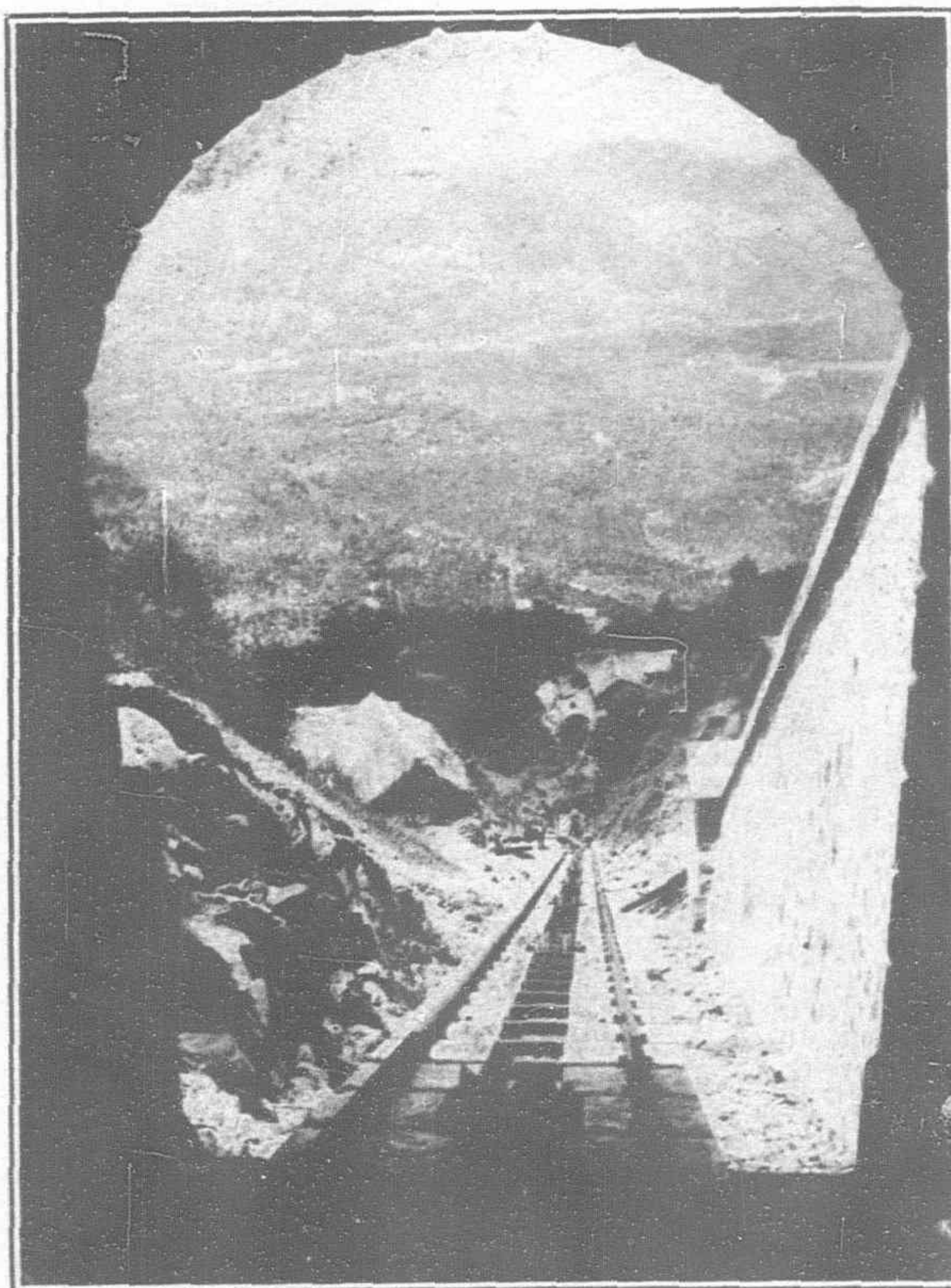
1. The hand brake
2. The solenoid brake
3. The emergency brake
4. The dynamo brake

1. The hand brake is operated direct from the operating platform and is applied by simply pulling a lever which has a ratchet attachment to prevent slipping, should the driver leave go for any reason.

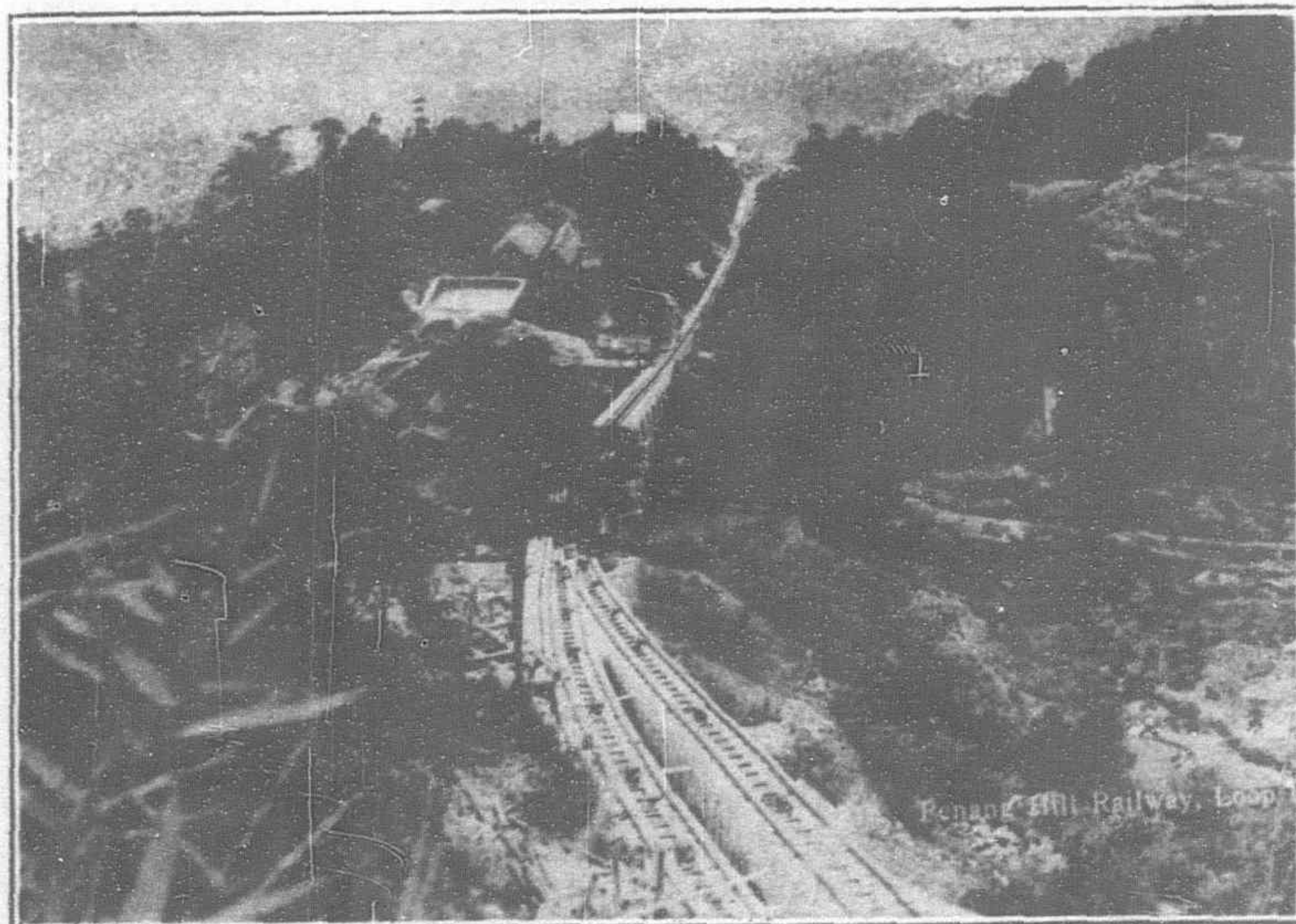
2. The solenoid brake is operated by the No. 1 controller and remains clear all the time unless the main circuit breaker opens or the controller is moved to the off position.

3. The emergency brake is controlled by the operation of the main circuit breaker, when the circuit is broken owing to the circuit breaker tripping it releases the plunger of the emergency brake solenoid, attached to this plunger is a weight so arranged as to strike the end of the brake lever, in striking this it releases a ratchet and allows a heavy weight (approx. 650 pounds) to apply the emergency brake direct on the main driving wheel.

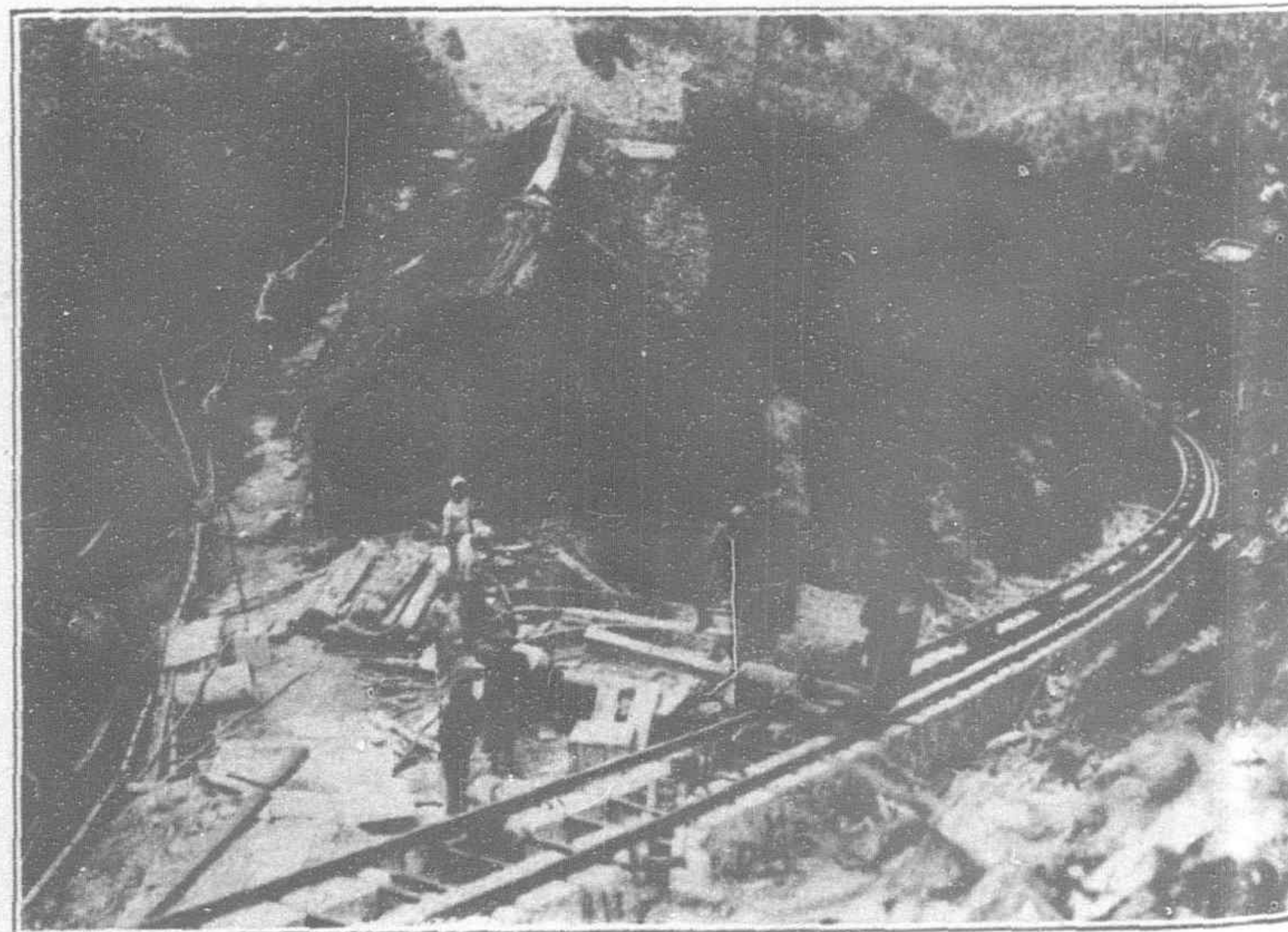
4. The dynamo brake is operated by the No. 2 or power controller and we have found in practice that with a full load of 3 tons 12 cwt. on the descending car, and the ascending car empty (which is of course the heaviest possible load) that a braking current of 100 amperes will bring the cars to



Lower End of Tunnel

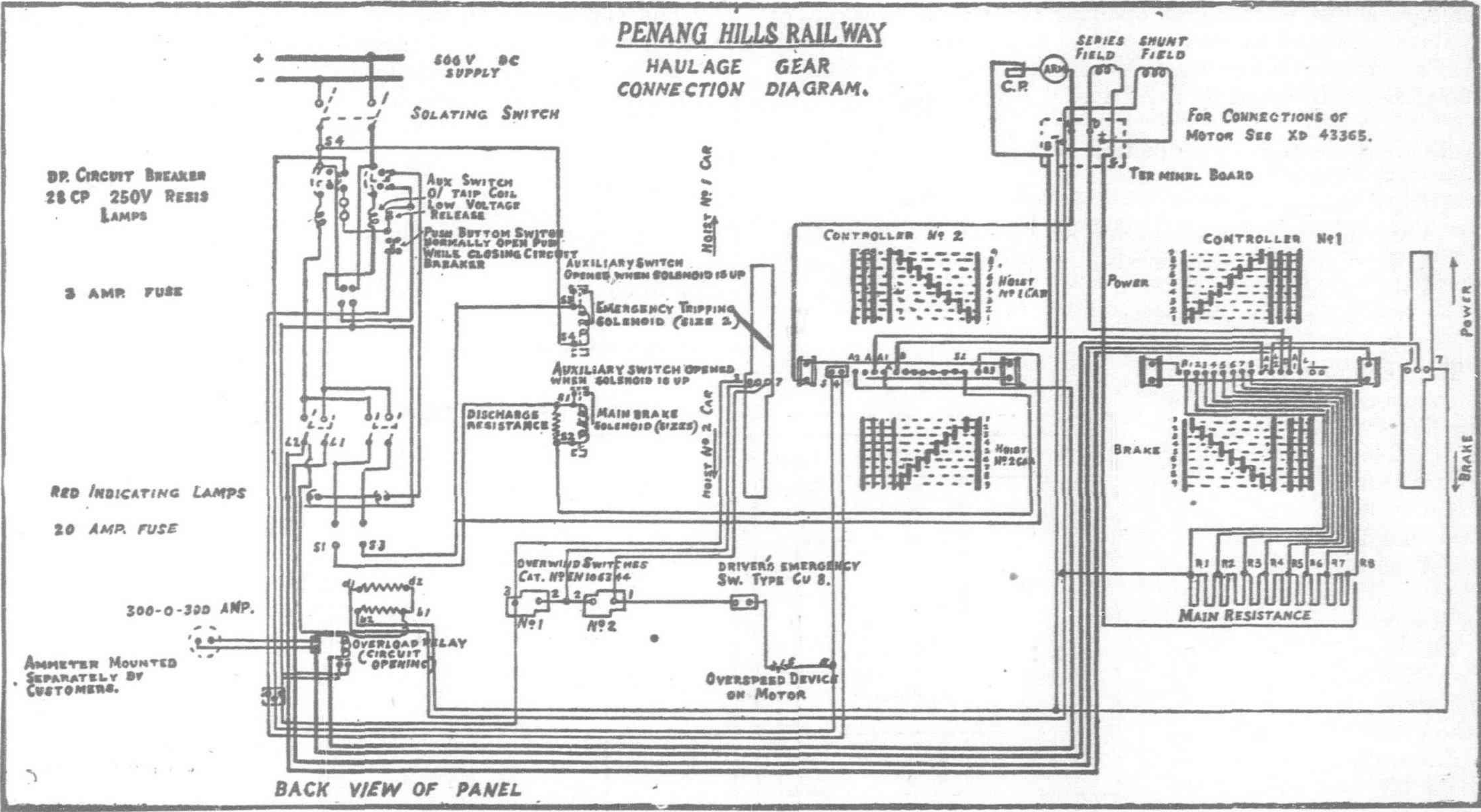


Loop Line



Half Way Curve

PENANG HILLS RAILWAY



practically a stand still from full speed, and about 50 amperes will keep the car within its correct traveling speed.

These figures in horse-power as measured at the motor were equivalent to 40 h.p. and 20 h.p. respectively, so that according to the position of the controller, the descending car has to drive by its weight and speed the motor as a dynamo and develop the equivalent of 40 h.p. This figure does not represent the full braking power of this method which if fully applied would be in the neighborhood of 100 h.p.

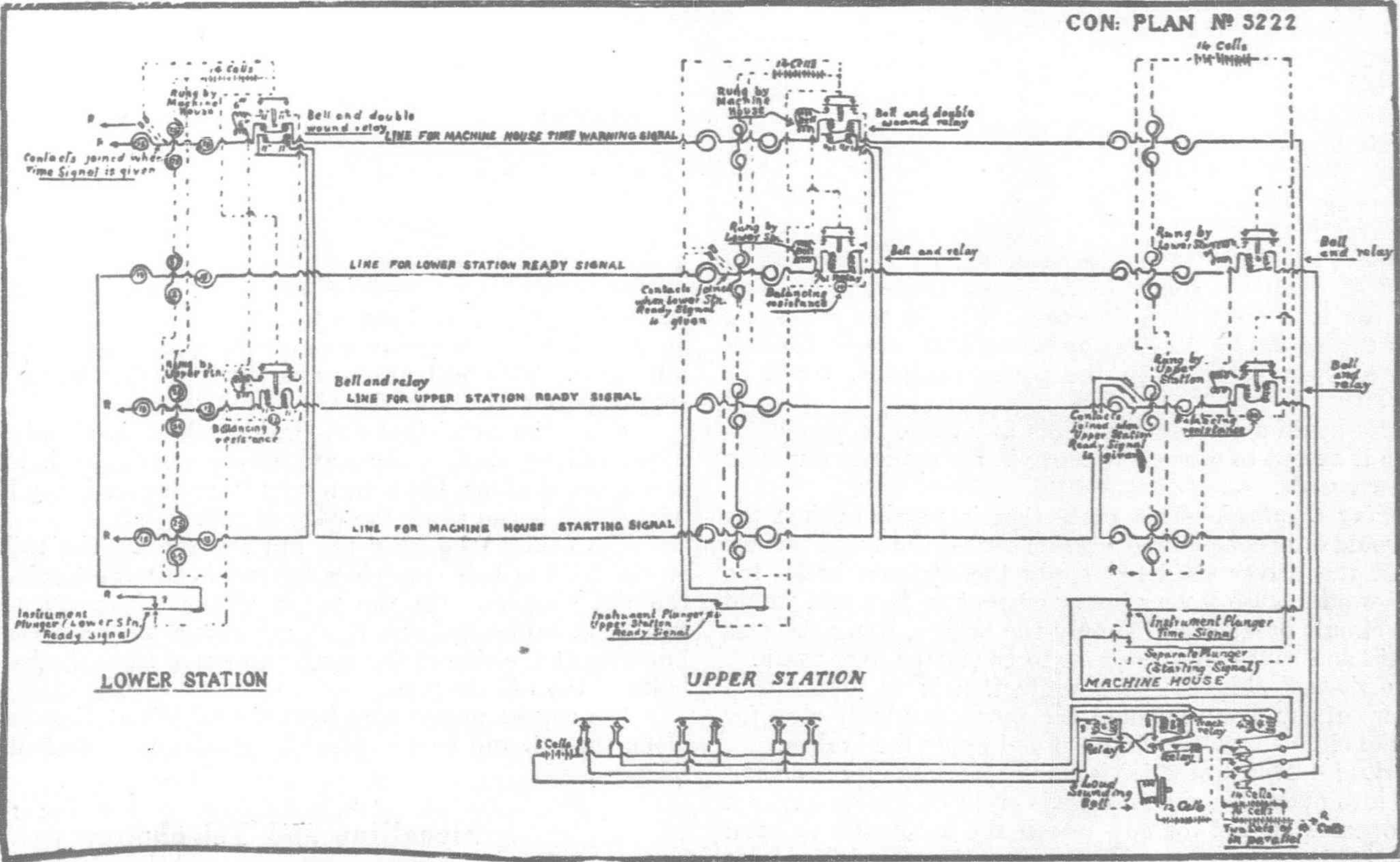
This method of braking is very convenient and also very efficient, and has the very great benefit of saving the continual wear on brake blocks which would otherwise take place if they were kept in continual operation for 12 minutes, this being the time it takes to travel from one station to another.

The energy generated when using the dynamo method of braking is dissipated in heavy grid resistances supplied for that purpose.

Protection

The methods of protection are very thorough and practically every possible source of trouble has been anticipated and prepared for.

The protection has been based on the operation of the main circuit breaker, and all the various methods simply have the effect of preventing the breaker being closed, or by causing it to open. The effect of the circuit breaker opening is to apply the emergency brake and the solenoid brake automatically as explained previously.



There are seven methods of opening the circuit breaker, of these five are arranged in series, so that it is necessary to have them all in commission before starting, otherwise the circuit breaker cannot be closed. If closed by the driver it would simply fly open again.

The different methods of protection may be classed as follows:

1. Emergency
2. Overspeed
3. Car No. 1 overrunning its correct stopping place.
4. Car No. 2 overrunning its correct stopping place.
5. Braking overload
6. Low voltage release.
7. Motor overload.

1. The emergency protection is operated by the driver from the control platform, and consists of a switch which opens the circuit through the no volt release coil. When the driver pushes the handle it opens the circuit and causes the circuit breaker to open automatically, applying the brakes.

2. The overspeed protection is fixed on the end of the motor shaft and would come into operation in the event of a heavy load on the descending car running away down hill and driving the motor at a speed above normal, this overspeed device would then operate and trip the circuit breaker and apply the brakes.

3 and 4. *The Overrunning Protection.*—This is similar for both No. 1 and No. 2 cars, but has independent switches, this is obviously necessary as otherwise should a car have tripped out the circuit breaker it would be impossible to close it again, unless there was some method of allowing the car to descend but not ascend.

This is done by special contacts on the reversing controller and these are so arranged that the contacts short circuit the tripping switch on the descending car, leaving the ascending car to trip out the circuit breaker should it over-run its correct stopping place. Reversing the controller reverses the switches.

For instance should No. 1 car over-run the circuit breaker can only be kept in when the controller is in the correct position to drive No. 1 car in a downward direction. Should the controller be moved to the ascending position by mistake the circuit breaker would at once open before even the power controller could be operated at all.

Therefore should a car over-run from any cause no power can be applied to it except to cause it to move in the opposite direction—that is downwards.

5. *Braking Overload.*—This protection is partly against the driver and would only come into operation should the speed become too high and the driver suddenly apply the dynamo brake too rapidly, this would cause a very heavy current to flow and would trip out the circuit breaker and supply the brakes, bring the cars to a stand-still and cause all operations to be started over again.

6. *Low Voltage Release.*—This protection is to deal with a possible failure of supply and should the power suddenly stop for any reason the circuit breaker will open and apply the brakes.

7. *Overload.*—This protection is mainly for the motor itself and would come into operation should a fault occur on the motor, or it would also operate should for any reason the automatic or hand brake be applied on a car or cars, thus preventing the driver from attempting to pull up the track as well as the passengers in the cars.

The controllers themselves are also fitted with an interlock so arranged that it is impossible to reverse the controller, until the second or power controller has been brought back to the clear or off position. This interlock also prevents the reversing controller being operated at all until the power controller has been moved to the off position.

The last and a rather possible source of trouble has been allowed for, and that is that the circuit breaker having operated by one of the above protections, the driver might leave his control platform without returning his controllers to the off position in order to close the circuit breaker, thus possibly starting the trains without any one being on the control platform. This has been overcome by arranging special contacts on the reversing controller which only allow the circuit breaker to be closed when the controller is in the position.

Lighting

The train lighting is carried out by means of batteries, switches and fuses being supplied for each compartment circuit, with a main fuse to protect the battery.

The batteries are of 100 amperehour capacity and there are complete spares so that one set is charging whilst the other set is in commission on the cars.

The station lighting is supplied from the municipal mains—the top station is alternating supply, the middle station is at present supplied by a motor generator operated from the railway supply main, but will eventually be supplied on the alternating current system from a local sub-station to be erected near the middle station.

The lower station will be supplied from a static sub-station near the foot of the hill.

Supply

The system of supply for the railway had to be made to suit the railway specifications which called for direct current.

In order to supply this economically and to fall in line with the complete electrical scheme for Penang, it was decided

to transmit direct to the top of the hill at 11,000 volts, and transform there in a sub-station to D. C. supply for the railway, and thus also enable a supply of A. C. current to be available for lighting purposes on the hill without having long overhead transmission lines up the hill itself. This will also enable Prai station when finished to supply power direct to the hill sub-station.

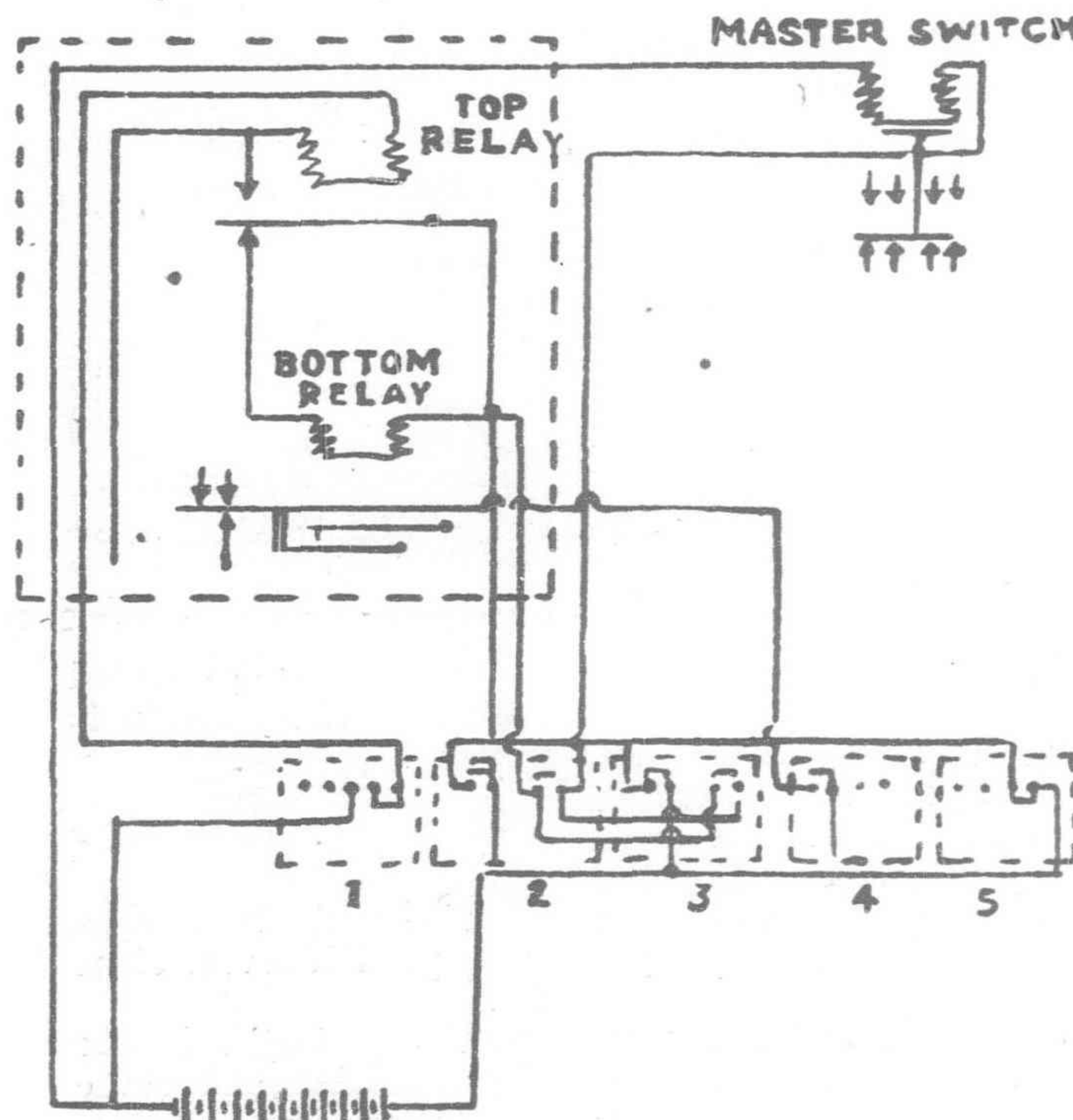
From the municipal sub-station which is situated near the upper railway station, there are feeders running to both the upper and lower stations, the return wire in each case being bare copper wire which is run along the edge of rail.

The cables supplying the hill are run up the railway itself, on the bottom half the cables are run inside the track hanging on the rail sleepers. On the upper section there are three wires, two A. C. cables and one D. C. cable, and they have been run on brackets at the side of the track supported from the holding down bolts of the rail sleepers.

The copper return wire from the middle station has been run along the rail and held in place by small clips attached to the rail sleepers.

Signalling and Telephones

The signalling system has been supplied and designed by



Hills Railway Switch Connections

- No. 1. Switch clears top relay
2. " rings bell and reverses indicator
3. " " " " "
4. Operates top relay
5. Clears " "

Bottom connections normally closed opened by car
Top " " open closed " "

Note.—Purpose of top relay is to prevent bell ringing and also to prevent indicators being reversed when carriage is leaving upper station.

Messrs. Tyer & Co. and whilst somewhat complicated has given every satisfaction since it was installed.

The visual signal consist of four holes in a plate, at the back of which is a second plate marked to show through the holes with the signal clear. The signal itself consists of a round red disc marked in white with the word READY.

These discs are operated magnetically by means of coils fitted on the back of the signal plate, and the currents are passed through each coil in turn, first in one direction by the operation of the different instrument switches, and then in the opposite direction by the operation of a master switch, which has the effect of returning all the signals to clear.

The instruments are fitted in the engine room and on the upper and lower station platforms, the master switch is fixed in the engine room and has its own main battery. All the signals at each station and also in the engine room are returned to clear by one operation of the master switch.

The method of operation is as follows:

Just before the correct starting time the driver depresses his switch, this gives the warning signal TIME, and rings a bell at the upper and lower station platforms, he continues to give this signal at intervals until the station master at the lower station answers by depressing his switch, which rings a bell at the upper station and in the engine room also giving the READY visual signal on all three instruments.

The station master on the upper station now depressed his switch which rings a bell at the lower station and in the engine room also giving the READY visual signal on all three instruments.

The driver has now his TIME signal, lower and upper READY signals, he then gives the starting signal which rings bell at upper and lower stations and shows the visual signal STARTING. The signals are now complete and the driver starts the train.

The signals are returned to clear by the train itself. The connections for this are made by means of special track switches and these have to be so arranged that the signals can only be returned to clear by the ascending carriage and not the descending carriage.

This is done by means of an extra track switch which operates a special stick relay, the purpose of which is to prevent the signals being returned to clear by the descending car, the latter passes over the first track switch which operates the stick relay and opens the circuit of the master switch which owing to the sticking action of the relay, remains open until the relay is cleared by the operation of the last track switch, this switch having cleared the stick relay the ascending car can now operate its correct track switch and return the signals to clear.

The track switches are spaced at intervals along the track near the upper station and one part of their duties is to return the signals to clear, another is to ring a warning bell situated just above the control platform in the engine room, the first warning bell is given by the fourth track switch situated about 30 feet below the station and gives the driver warning to stand by; the brake signal is given by track switch No. 3 which is placed in such a posi-

tion that the driver should apply the brakes at full power whenever the bell rings.

Should the driver fail to apply the brakes in this position then just above this point the car strikes against the overwinding safety device which trips out the circuit breaker and applies the emergency brake as explained previously.

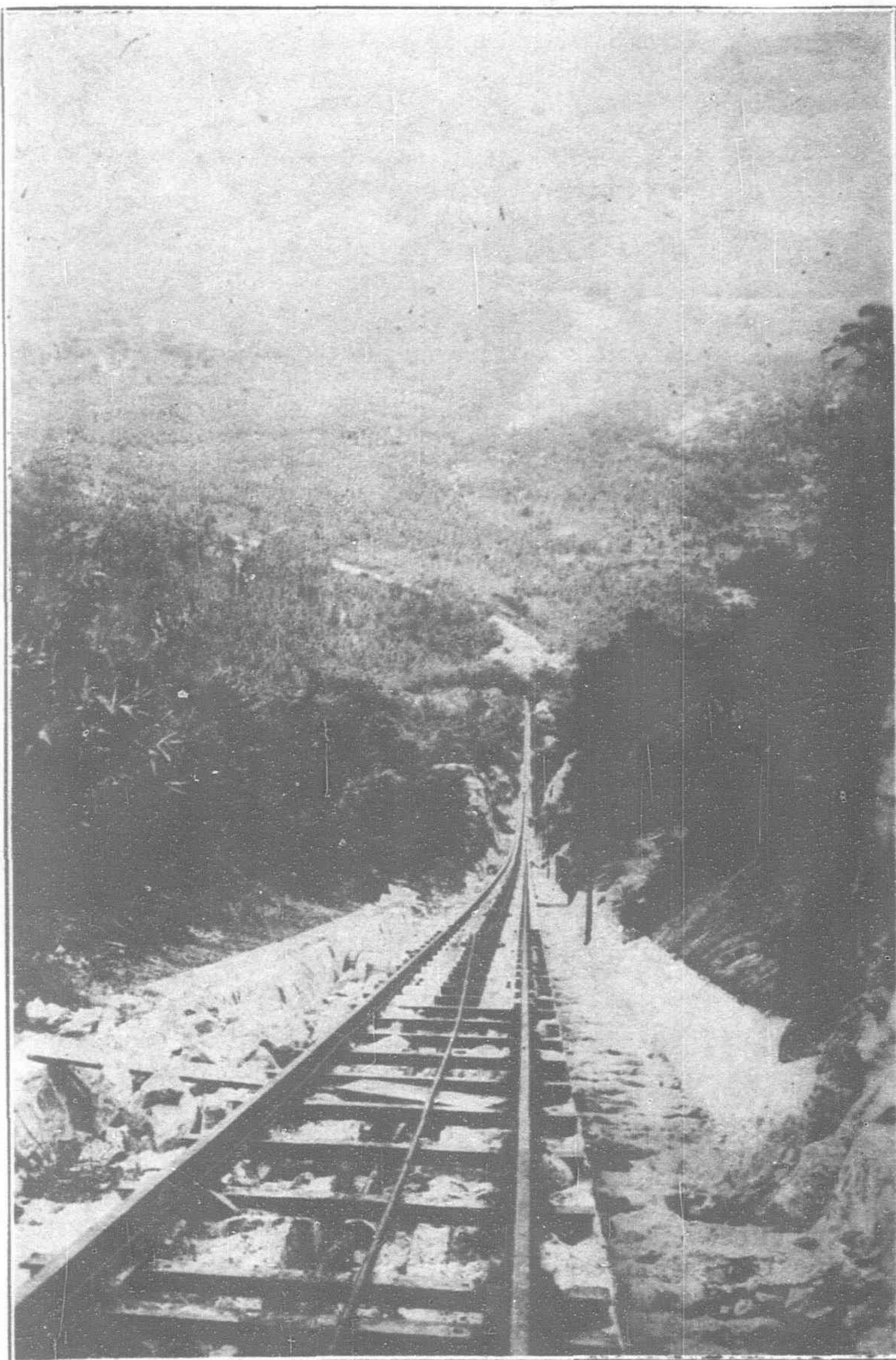
The line wires for connecting up the different signals are carried overhead on telephone poles in a manner similar to telephone wires; at each end of these wires they are joined to lightning arresters of the carbon type, these consist of two carbon blocks separated by a sheet of mica with holes pierced through, should lightning strike the line it jumps across through one or other of the holes in the mica to the second carbon block which is connected to earth.

The telephones on the railway may be classed as service telephones and track telephones. The service telephones are arranged to speak from one station to another and also from the bottom through the middle station to the top station. These are independent telephones and have no connection with either the track telephones or the post office lines.

The track telephones are carried on poles run adjacent to the track, and are used by means of special poles one of which is carried on each car. These telephones are for the purpose of speaking from the train to the engine house in the event of trouble either on the car or on the track.

The method of using them is very simple and the car conductors can use them quite well to communicate with the drivers. If a car conductor has trouble and wishes to stop the car he does so by simply joining the two wires together by means of a brass bar on the end of a pole, this rings a bell on the engine room telephone, the driver at once applies the brakes and when the car has stopped the conductor hooks the pole on in such a way that it makes contact to both wires, one contact on the bar, the other on the hook. The telephone is then ready for use, the conductor can speak to the driver and when finished he lifts off the pole and everything is clear again.

In the event of trouble with the signals the telephones can be used for despatching the trains.



A Beautiful Tropical Panorama, Half Way Down the Penang Hills Railway

The Johore Causeway

(Continued from page 91).

in 1919. As the firm had recently completed extensive works in connection with Singapore harbor, it was in a particularly favorable condition to undertake and carry out quickly such an important work as the building of the causeway, the cost of which is, we understand, estimated at 17,000,000 dollars, or about £1,955,000. This outlay will be borne jointly by the governments of the Federated Malay States, the Straits Settlements, and the Protected Malay State of Johore. Mr. James Brown, M. Inst. C.E., is the chief superintending engineer in the Malay States on behalf of the consulting engineers; while Mr. D. Paterson is the resident engineer under Mr. Brown in actual charge of the causeway.

Industries of Indo-China*

GENERAL

THE different countries of the union offer splendid openings to industries of all kinds as the raw material found there is exceedingly varied.

The first question, as in all newly opened countries, is that of transportation, and it must be confessed that in spite of the great efforts which have been made to improve the means of communication in Indo-China there yet remain huge tracts—notably in Laos and in the mountain region of Upper Tonkin—where little as yet has been done in this direction. In Laos, on the Siamese as well as the French side of the frontier, the only important trade is that in teak exploited by the Société de l'Est-Asiatique, the resultant timber being floated down the Me-kong.

On the other hand in the deltas and in the mountains where means of communication already exist, works are being established daily and thanks to the abundance and variety of raw material and to workmen who are generally adaptable and clever, very remarkable results have been obtained. This development is especially striking in Tonkin where conditions are very favorable, and for this reason the following article deals chiefly with Tonkinese industries.

Cambodia

Industrial operations in Cambodia though recent are full of promise. Attention may be called to that already mentioned in the connection with agriculture, viz., the Compagnie Générale des Soies de France et de l'Indo-chine, to which may be added the Comptoir de l'Industrie Cotonnière and to the saw-mills, including

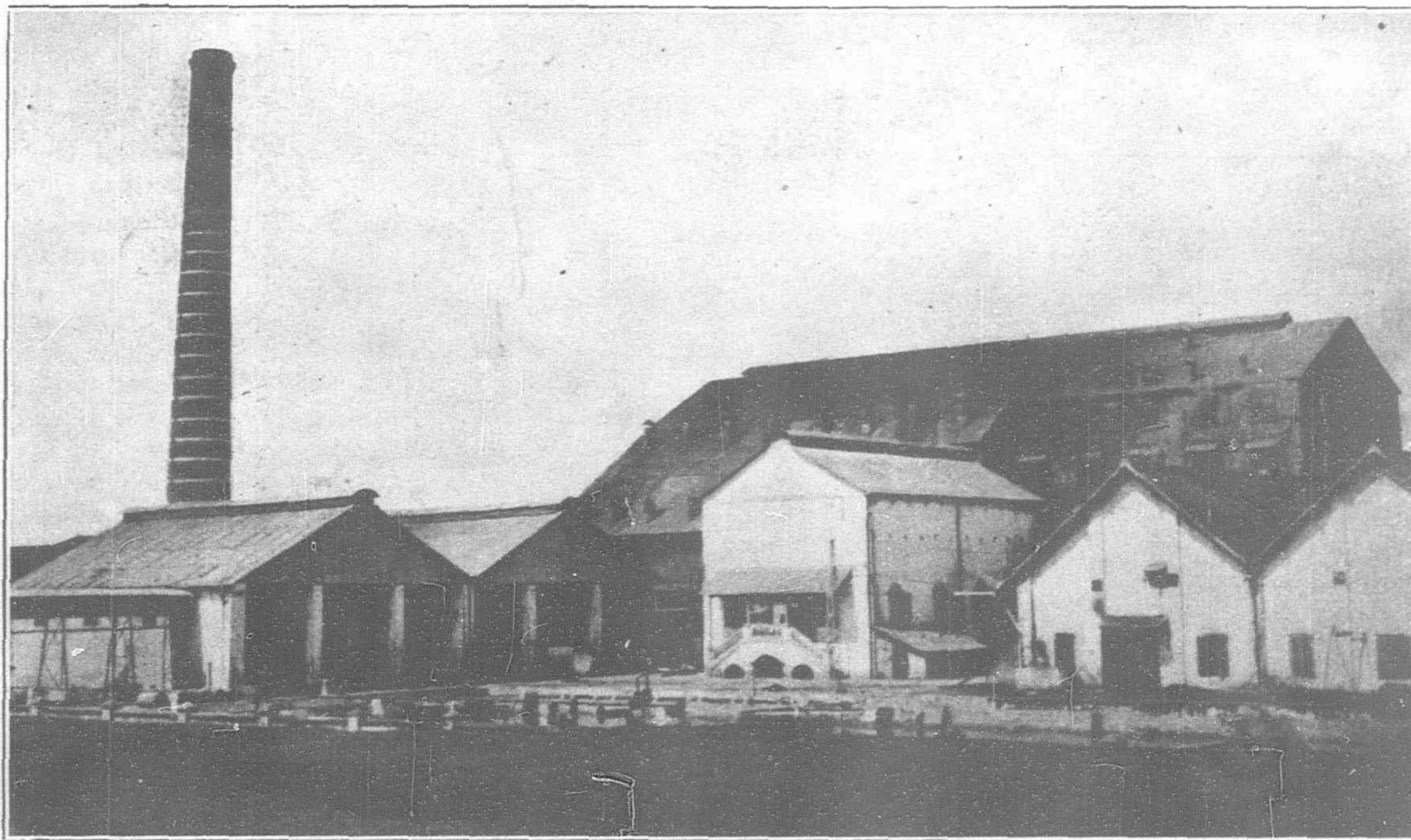
those of the new Société Forestière du Mé-kong. At Pnom-Penh a mill for the husking of rice has just been opened which can handle over 30 tons of paddy per day and which betrays the desire of the Cambodian rice growers to become independent of the middlemen and port of Cholon-Saigon and to export the rice grown in the rich province of Battambang directly from the port of Pnom-Penh, accessible to sea-going vessels.

Cochin-China

A. INDUSTRIAL CENTRE OF SAIGON

At Saigon, the capital of Cochin-China, several industrial enterprises are to be found.

Rice-mills.—The milling of paddy occupies an important place. The powerful Société Française des Distilleries de l'Indo-chine, of which more will be said when treating the industries of Tonkin, as well as the Chinese and French rice-mills, are naturally much interested in milling of paddy, and among these latter mention may be made of the four mills of the Société des Rizeries d'Ex-



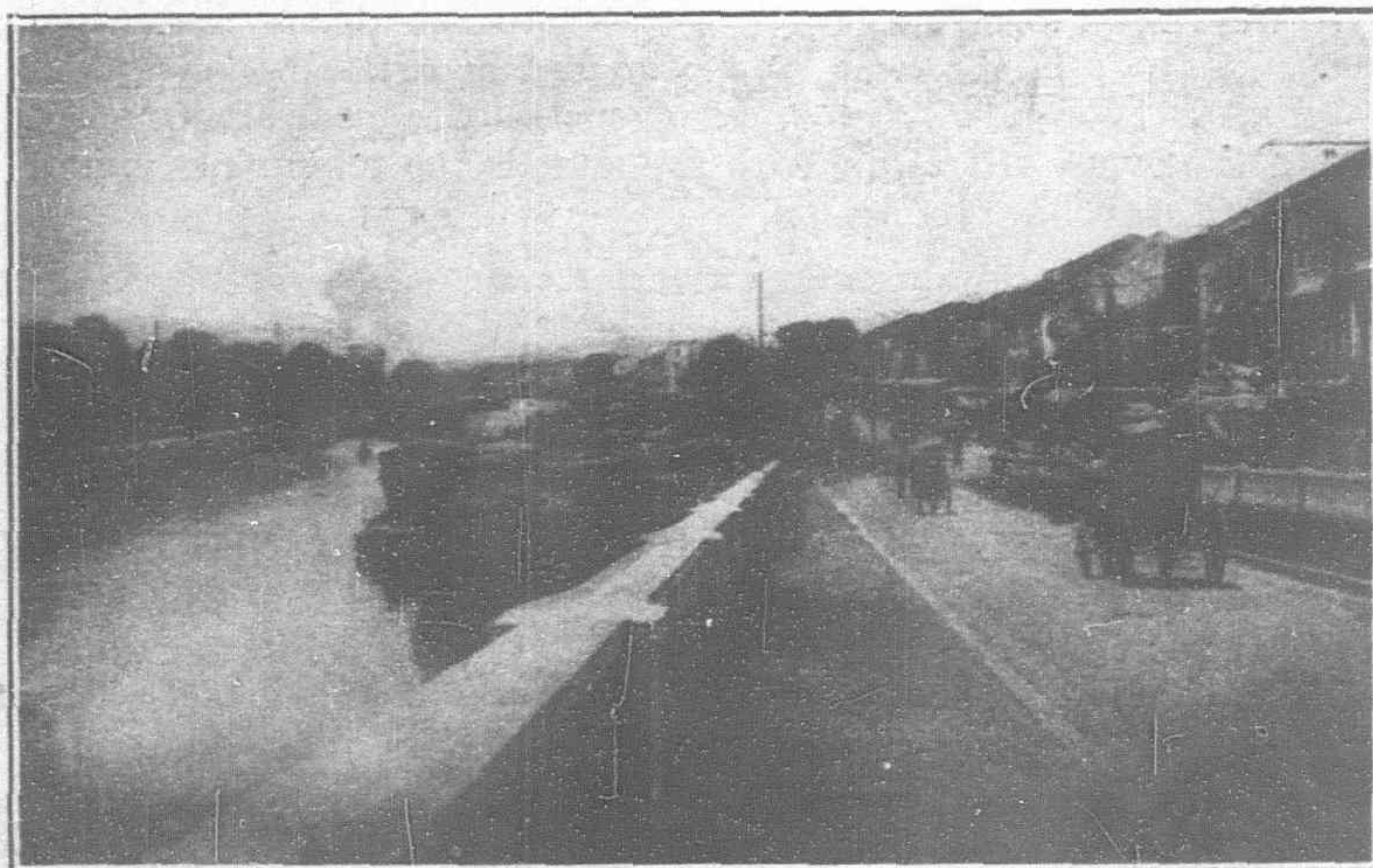
One of the many Rice Mills at Cholon near Saigon, the centre of the Rice Industry in Cochin-China

trême-Orient with a capital of 25 millions francs, which can turn out every day 2,500 tons of No. 2 white rice.

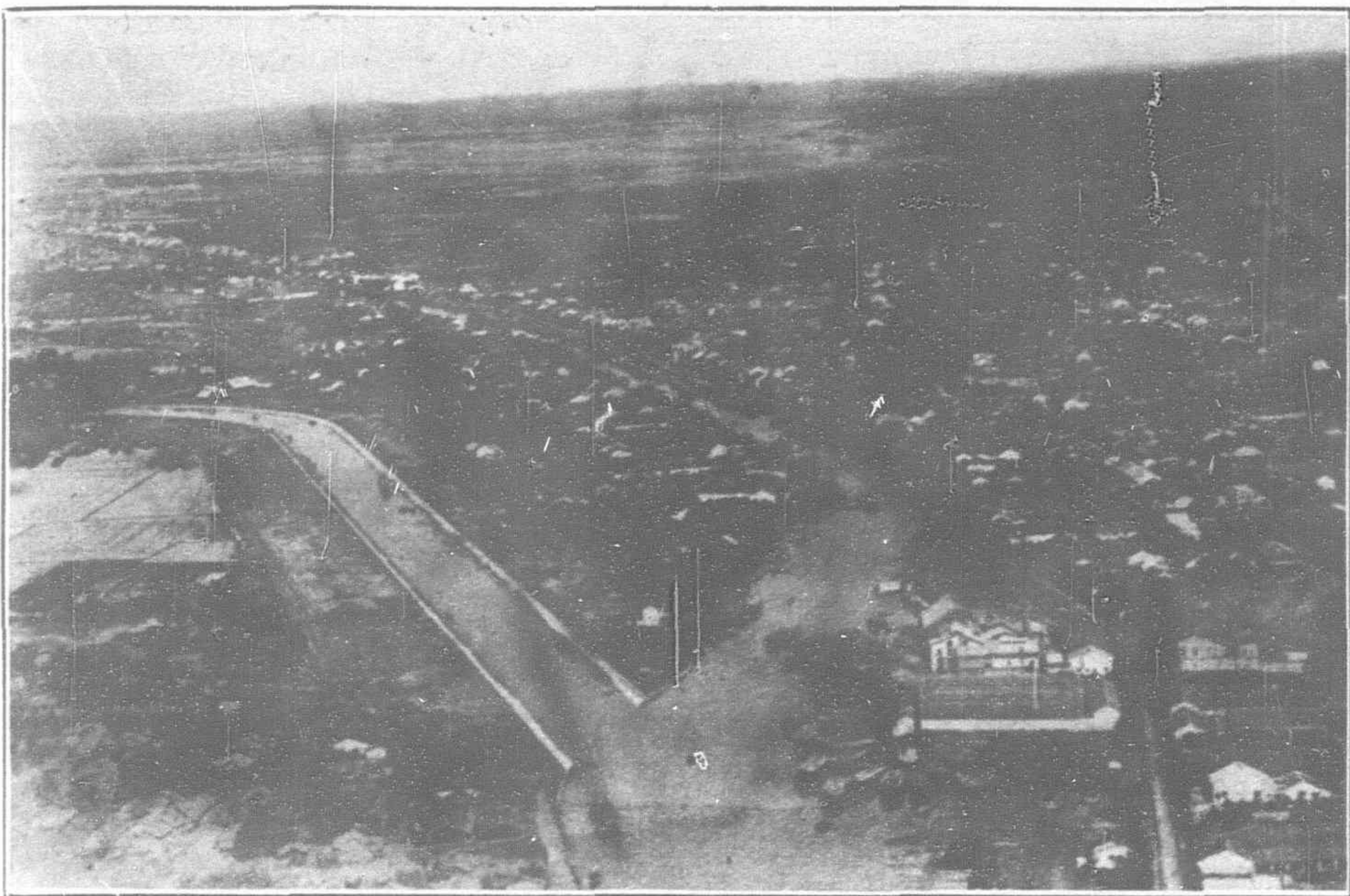
The number of these mills is continually increasing in the form of small husking plants driven either by electricity or steam and owned chiefly by Annamites or Chinese, some of which can handle yearly up to 5,000 tons of paddy.

Other Agricultural Industries.—As the outcome of the rubber plantations of the country the Compagnie du Caoutchouc manu-

*Article written by the Department of Economic Service of the Indo-Chinese Government.



THE BUSY QUAYS OF CHOLON.—Junks unloading Rice for the Mills



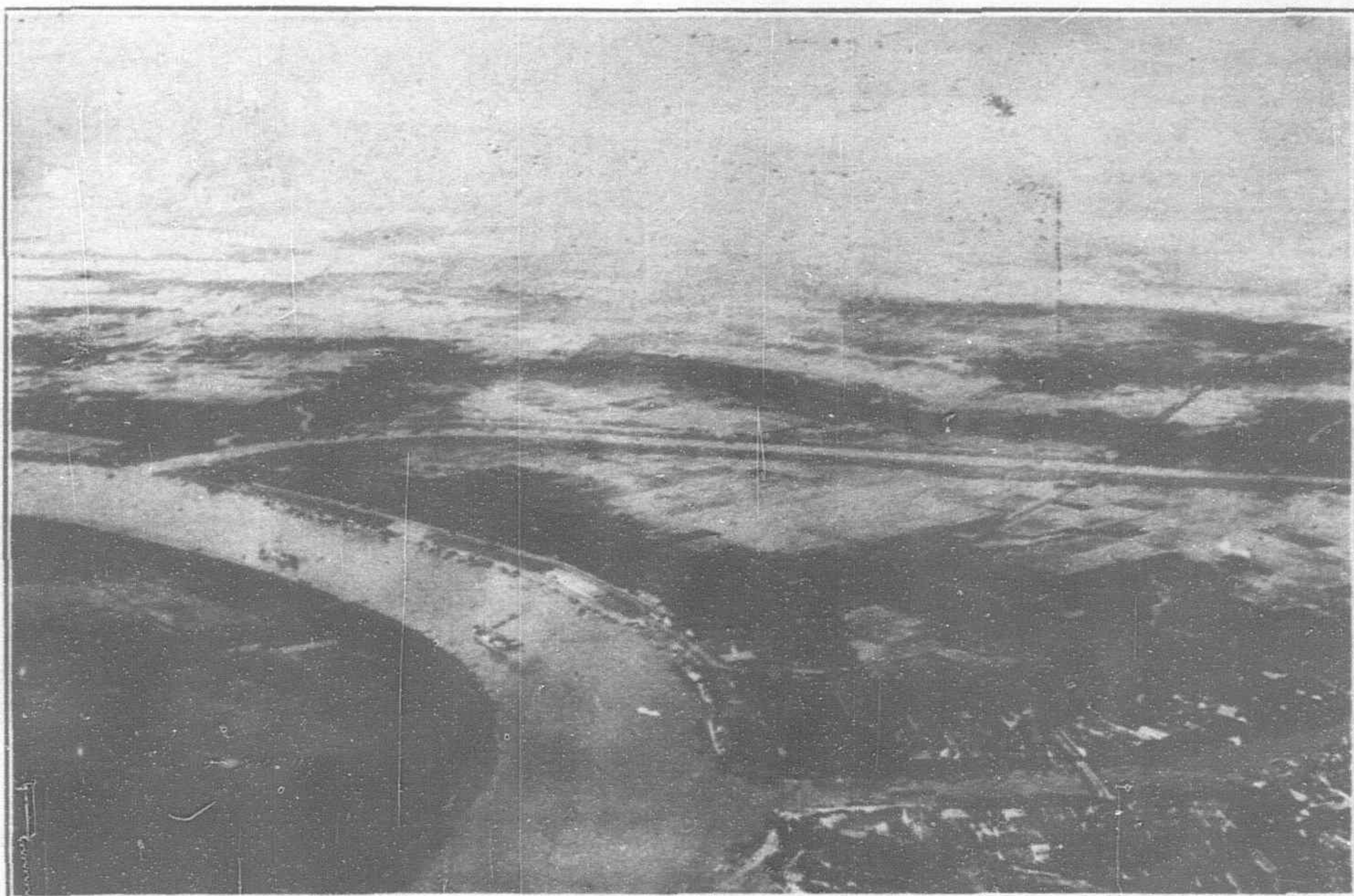
Aerial view of Cholon and its Rice Mills

facturé, with a capital of 400,000 frs., has been established and manufactures most of the usual rubber articles, such as, bandages, belting and tubes of all sizes, etc.

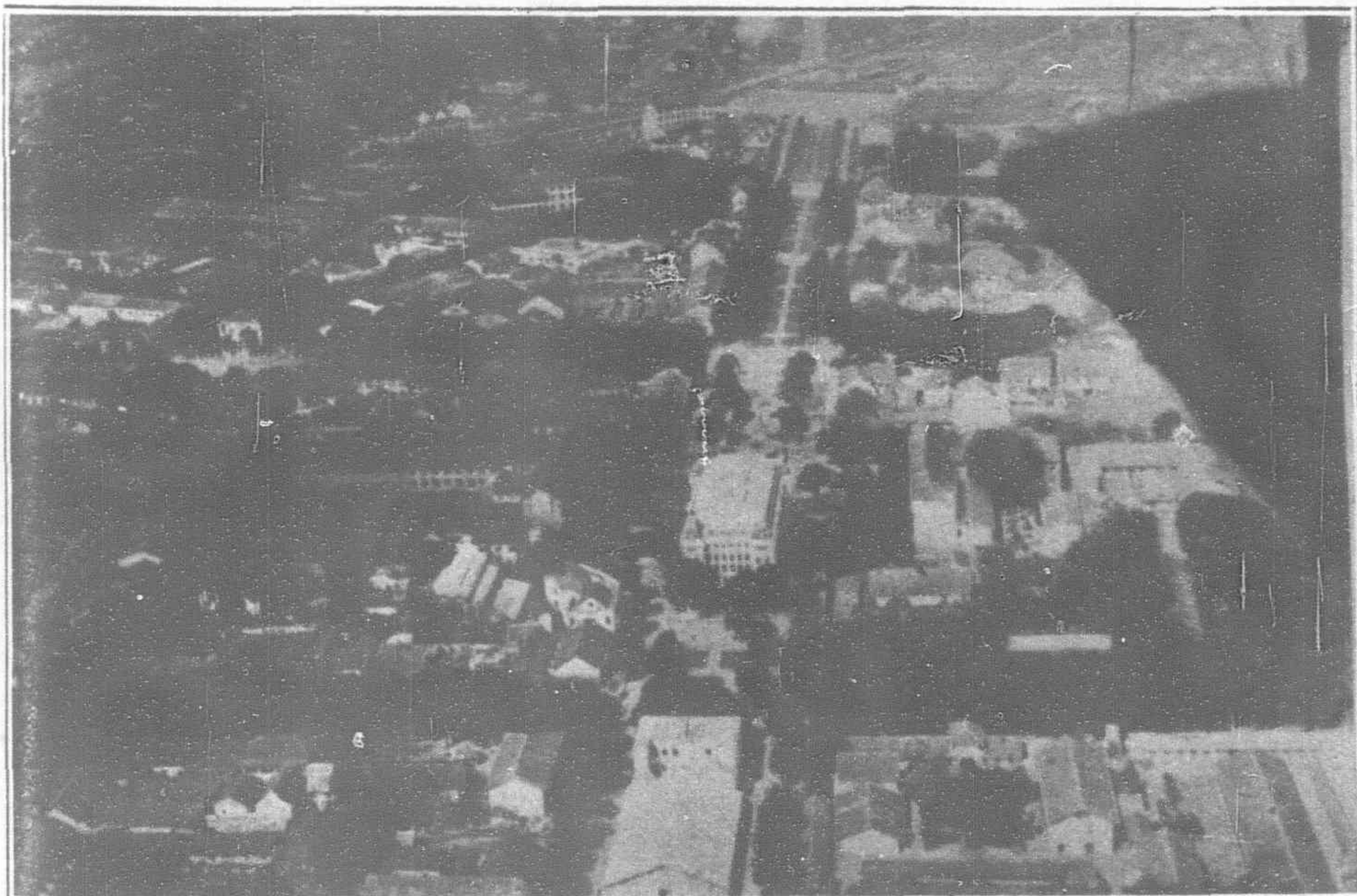
Oil presses and soap works with modern appliances treat copra, ground nuts and various oleaginous seeds, such as, sasame, cotton, kapok and hevea. One mill of 60 h.p. founded by an Annamite, handles from 25 to 30 tons of raw material per day.

Besides the primitive native sugar-mills, two quite up-to-date modern ones have been opened.

Mechanical Industries.—Mechanical workshops with modern tools are in full activity, of which mention may be made of the Société des Forges, Ateliers et Chantiers d'Indochine with a capital of 3 million francs and of the Société d'Oxygène et d'Acétylène d'Extrême-Orient, also with a capital of 3 million francs. The arsenal of Saigon, which played an important rôle in educating skilled labor in Cochin-China, undertakes the repairing of ships and has just successfully completed the construction of the *Albert Sarraut* a large cargo-boat of 3,100 tons burden.



The lower end of the Port of Saigon: showing the diversion canal recently cut through to Cholon



Beautiful Saigon, with its wide shaded streets and boulevards, handsome public buildings, parks, and open air cafes has well earned its title of Little Paris

The Société Française d'Entreprises de Dragages et de Travaux Publics with a capital of 5 million francs has by means of its powerful modern dredgers removed during the last ten years over 100,000,000 cubic yards of mud; it also owns an important repairing workshop.

The Compagnie des Eaux et d'Electricité de l'Indo-chine with a capital of 10 million francs distributes electricity to Saigon-Cholon and Pnom-Penh. The central station at Sho-Kwan (Saigon-Cholon) of 7,000 h.p. supplies Saigon-Cholon and, by means of high-tension lines over 37 miles long, the towns of Jia-Dinh, Bien-Hoa, Thudaumot and Laithieu as well. The same company supplies water to these towns. The Sho-Kwan central station has been doubled by the addition of another station of 10,000 h.p. (to be brought up eventually to 20,000 h.p.) in order to feed the wireless post and the tramways, for which a new company, the Energie Electrique Indo-chinoise with a capital of 10,000,000 francs has been formed.

Wireless Post.—This post, just opened, secures direct communication between France and Indo-China, and it comprises: (1) an emitting

centre close to the new central of Sho-Kwan above mentioned, with two 500 kw. high frequency alternators and with antennæ carried by eight 820-ft. masts; (2) a receiving station and (3) offices situated in the commercial centre of Saigon.

The opening of this station has made Indo-China independent of foreign cables and given it a cheaper and much more rapid service when communicating with the mother-country and is therefore of great political importance, while on the other hand the trade of the colony will benefit enormously.

From a technical point of view this station is the largest of any in tropical countries in the whole of the Far East., and is in fact the third largest in the world, as it is equal to that at Bordeaux-Croix d'Hins and is second only to that at Melun-Sainte-Assise, all three in French territory.

Outside this main wireless station at Saigon a system of smaller posts will ensure communication all over the union.

B. INDUSTRIES IN THE INTERIOR OF INDO-CHINA

In the interior, the Bienhoa Industrielle et Forestière, with a capital of 6 million francs, is

methodically working the immense forests, and supplies besides constructional timber, firewood and charcoal, products of distillation, such as, methylene, pitch liquid black, etc.

Finally numberless secondary industries are scattered about the country and contribute to its prosperity—saw-mills, brick-yards and dye-works, many of which belong to Annamites. Among the native industries those of weaving mats and silk-worm rearing may be mentioned, the latter especially.

Annam

In Annam industries are connected chiefly with the forest trades and in North - Annam the trade in ironwood and other kinds of timber (either unhewn or in slabs) with Tonkin is very important. A few saw-mills and means for charcoal burning are to be found in this district, and there are two match factories at Thanh-hoa and Benthuy near Vinh.

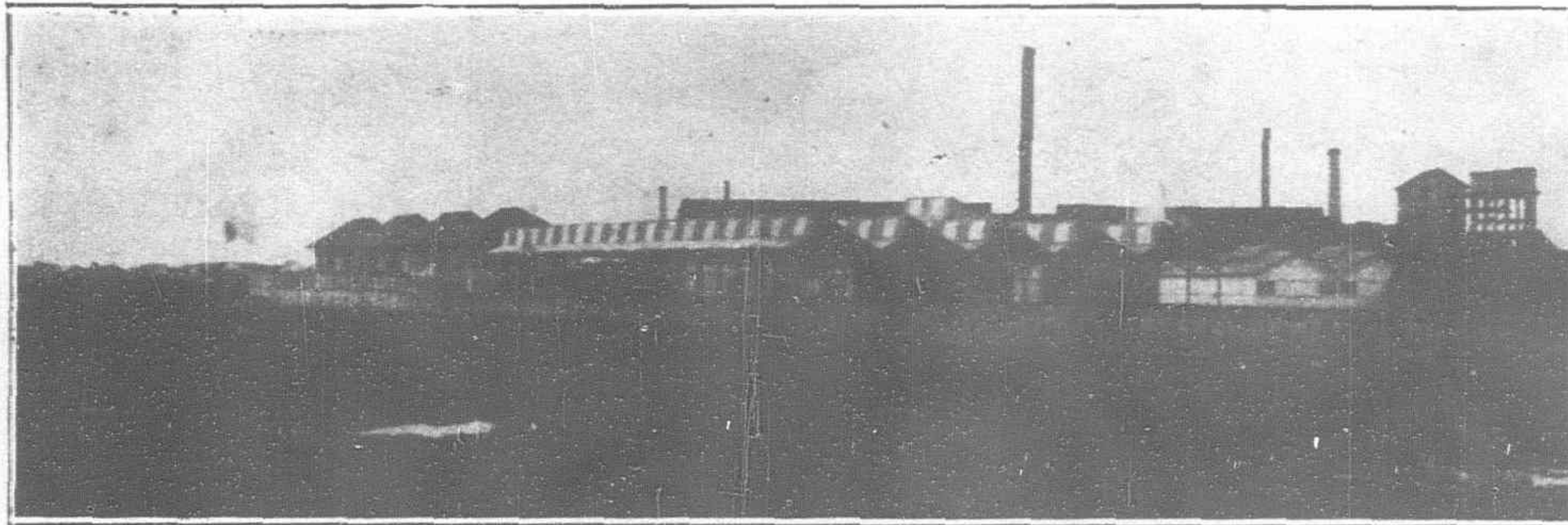
Messrs. A. Lapicque et Cie also have a meat-preserving establishment fitted up in the most improved manner, at Benthuy.

In Central Annam the Lang-Tho works near Hue manufacture various articles in cement and terracotta as well as enamelled ware and hydraulic lime of a yearly value of over 150,000 piastres.

The silk industry is increasing and besides the numerous native family workshops a French firm, Messrs. L. Delignon, have mills at Kwi-Nhon remarkably well fitted up.

Tonkin

But the country of the union offering the best perspective of industrial development of its already important and varied industries is undoubtedly Tonkin, and this is due to its abundant and relatively robust labor and to the wealth of its sub-soil, especially in coal. It may be noted that



A modern Rice Mill at Cholon

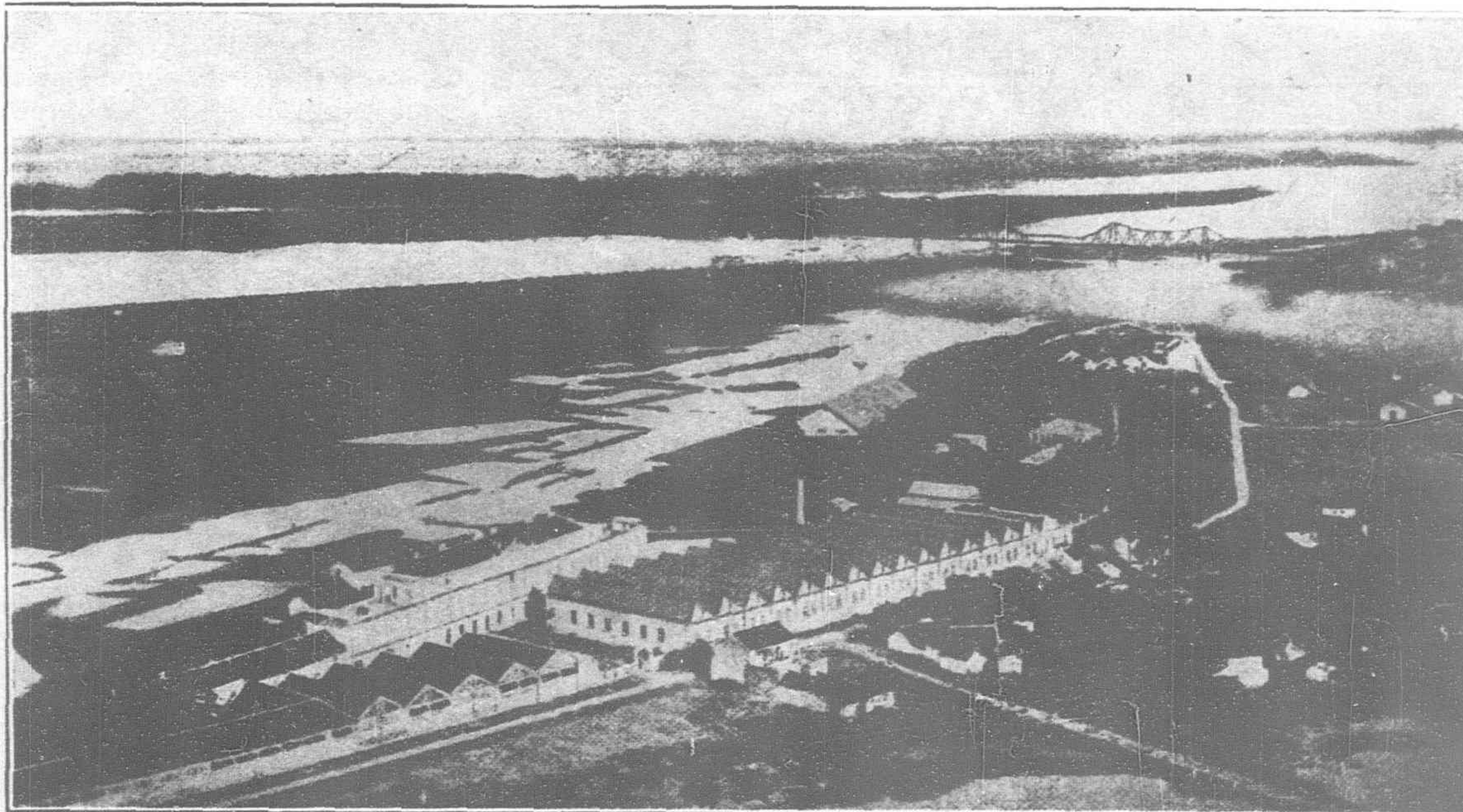
the glowing picture which we are about to present we would first offer a word of warning on matters which, though simple and well-known to old colonists, have often brought vexation, and even insuccess to the new-comer.

Situated in the tropics and inhabited by a race having its own ancient civilization so entirely different from ours, Indo-China presents serious difficulties which it would be eminently unwise to hide.

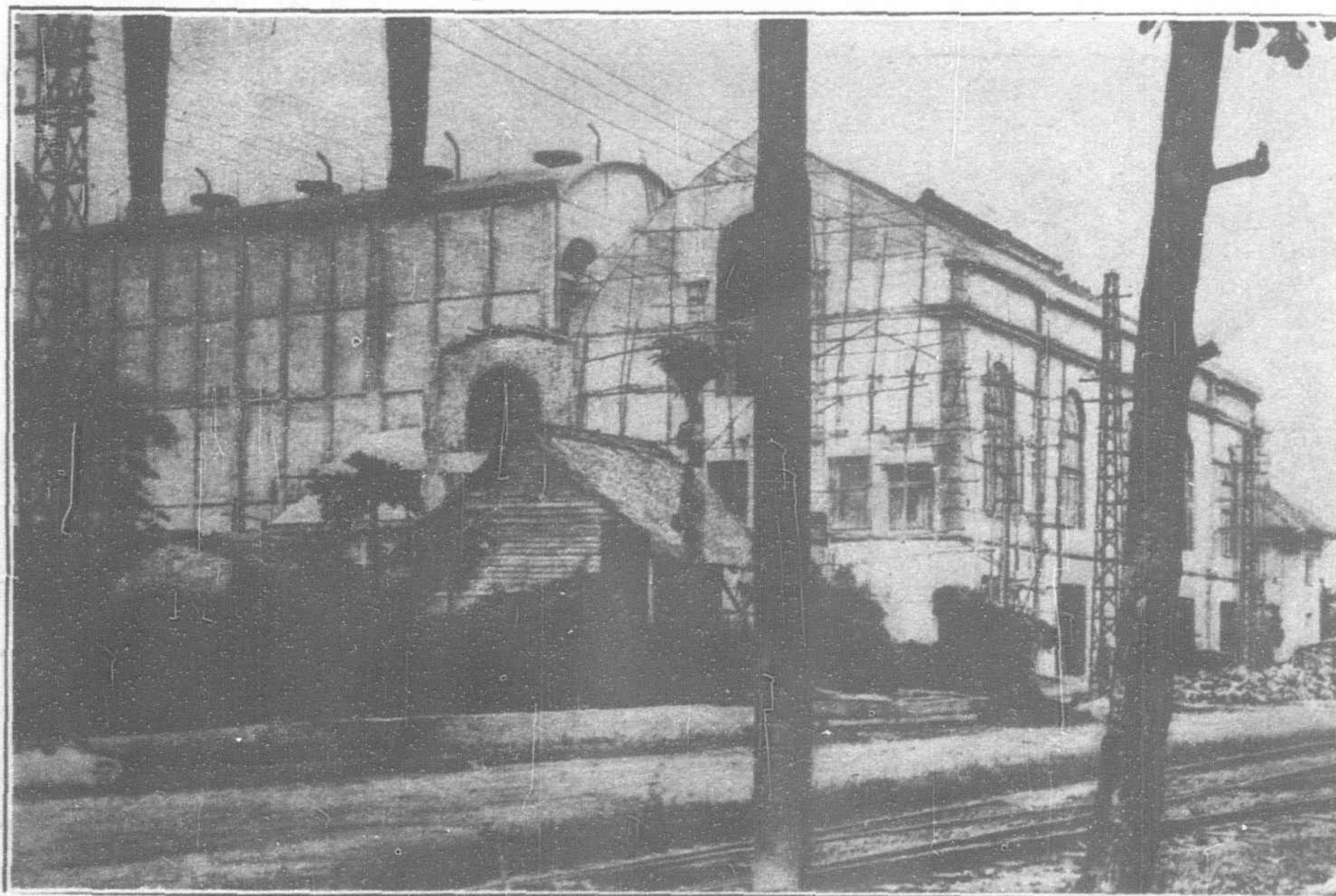
Both raw and secondary materials present serious differences from those growing in temperate countries, for the climate undoubtedly exercises an influence not only on the qualities of these materials but also on their finished product and even on their packing and on the extent to which they respectively sup-

port long sea voyages, etc.

Annamite labor, abundant in the deltas, is averse to working in the mountains where it is more susceptible than Europeans to catching fever. Annamites exhibit adaptability and skill of the highest order and are remarkably sober, but they possess the defects of their good qualities, skiful, they become jacks of all trades and masters of none, having few wants, they do not strive for high wages but are content to work just sufficiently to keep them going, further, most of the working-men are composed of peasants accustomed to return to their native village to help in gathering the rice harvest, all elements of instability, except among the really skilled men. This last defect is naturally not so notice-



The Tobacco Factory at Hanoi



The New Electric Power Station at Saigon

able in factories established in the plains close to large towns, as it is in the more or less isolated mining centres in less healthy districts.

It is not surprising, therefore, to have sometimes to seek the solution of technical problems hitherto unsuspected or to be bitterly disappointed over such otherwise excellent labor.

Sometimes from lack of recognizing these difficulties natural to the countries, enterprises, in themselves excellent, have been grievously hindered through costly mistakes or even entirely stopped.

It need hardly be pointed out that the length of time taken in starting a new enterprise and the cost of the same is in indirect ratio to the experience of the person undertaking the same, for for want of valuable and numerous assistants (whose salaries are naturally high) the personality of the manager is generally of much greater importance in the Far East than is the case in Europe where a technical and commercial staff is easily found.

The Chief Industrial Centres of Tonkin.—Here owing to the facility of obtaining both raw materials and labor, industrial enterprises, other than those of mining and of metallurgy already described in a previous article, have grouped themselves in convenient centres, of which the chief are Haiphong, Hanoi, Nam-Dinh and Dapcau.

A.—HAIPHONG

Haiphong, thanks to its fluvial and maritime connections and to its proximity to the rich coal-fields of Hongay and the Dong-Trieu, has attracted the lion's share of the industries in question.

Here is to be found the splendid cement-works, known all over the Far East, founded by the Société des Ciments Portland Artificiels de l'Indo-chine, a limited liability company established in 1899 with a capital of 2 millions of francs and with a staff of over thirty Europeans and more than 7,000 Annamite workmen, which turns out yearly 150,000 tons of cement equal in quality to the best brands of Europe. These works will be shortly doubled by the addition of a 3,000 h.p. turbo-alternator and the construction along the river bank of a new works with all the most modern improvements.

At the other end of the town large chemical works have just been completed by the Société Industrielle de Chimie d'Extrême-Orient, having a capital of 11,250,000 francs when founded, but recently increased to 20 millions. These are run by electric power of 2,000 kw. and are at this moment turning out caustic soda, very rich chloride of lime, eau de javel (hyperchlorite and chloride of potassium) and sifted lime; shortly it will manufacture hydrogen gas, chloride of calcium and liquid carbonic, hydrochloric and sulphuric acids; later on, it is hoped chemical fertilizers will be made. The success of these works will be a feather in the cap of French colonization and should favorably react on new as well as on existing industries much hindered in their development by lack of chemicals.

Haiphong also possesses well equipped mechanical work-shops of which the two most important are: the Société de Constructions Mécaniques and the Ateliers Maritimes. The first named employs some from 350 to 400 workmen and manufactures marine boilers, steam engines (including a 550 h.p. triple-expansion engine) machinery for agriculture and mining and machine-tools. It also builds steam launches, tug-boats and wooden and steel barges and it is ever increasing its field of action. At the present time it is engaged in minting for the Tonkinese government and by means of the most modern machinery, copper sapeks which it is turning out at the rate of 17 millions pieces per month.

The Ateliers Maritimes, which have recently enlarged their works and now employ over 1,200 natives, undertake every sort of maritime construction and every variety of public works, such as bridge building, the making of reservoirs, etc. Their ship-yard has turned out numerous 120 to 150-ton barges and recently two big cargo-boats of 1,500 tons burden, the *Van Vollenhoren* and the *Fils Doumer* have been built. They undertook the building of the Bar-Thuong dam by means of compressed air, the construction of which will enable 173,000 acres of rice-fields in North-Annam to be irrigated.

In the same town are to be found the following works: those of the Société des Phosphates du Tonkin with a capital of 100,000 piastres which is gradually extending its sphere of usefulness and now has an annual output of 10,000 tons; works for making patent fuel and agglomerated blocks for building purposes; tile and brickworks with modern machinery; glass-works which had

at first difficulty in obtaining fire-clay, but this has now been successfully got over; a cotton spinning mill employing about 900 Annamites and turning out native fabrics which are more and more appreciated; several rice-mills, one of which was erected by the Société des Rizeries Indo-chinoises (with a capital of 4 million francs) and is of 250 h.p. and employs over 300 workmen, being equipped in a very complete manner with modern machinery and capable of turning out 200 tons of rice of the first quality per 24 hours; an oil and soap works founded by a group of Indo-Chinese rice-mill owners and fitted to produce daily 20 tons of oil and 10 tons of soap extracted from coco-nuts, earth-nuts and cotton and castor oil seeds, which mill also distils turpentine and resin from the gum obtained by tapping pines and possesses other shops for similar products; and a small paint factory where bankul-nut oil, a siccativ oil of the highest quality, is used.

To sum up, Haiphong is already a large industrial town with very varied activities and should ere long take a foremost place in this respect in the Far East.

B.—HANOI

The Société Française des Distilleries d'Indo-chine has its offices at Hanoi. Established in 1901 as successors to Messrs. A. R. Fontaine et Cie, this company has increased its capital to 11 million francs and has the whole union as its field of operations. It actually owns three distilleries in Tonkin and one in Cochin-China, which are fitted to produce annually about 5,500,000 gallons of alcohol and are each equipped with ginning mills. The three works in Tonkin can handle 54,000 tons of paddy per year and that at Cholon in Cochin-China nearly 50,000 tons. The three works are of 1,000 h.p. in all.

This same Company has erected works for the preparation of new sorts of products from rice such as nitrogenized products, starch, glucose for confectionery and breweries, and denitrogenized rice also for breweries, and it is about to erect at Cholon a rice mill of 500,000 tons, as well as an oil-mill and works for the production of nitrogenized products.

The financial group of the Société des Distilleries de l'Indo-chine participates largely in other industrial companies, such as the Société Industrielle de Chimie d'Extrême-Orient, of which the splendid works at Haiphong have already been described, the Société des Anthracites du Tonkin, which works the collieries of Mao-Khe and of Trang-Bach, already described in the previous mining article. It is also interested in the growing and manufacture of tobacco in Tonkin.

The Société des Tabacs de l'Indo-chine with a capital of 6 million francs, employs some 700 persons and its productions, which it took a long time to bring to perfection, are now known all over the globe; it also sends tobacco leaves to the European market.

The Société des Tanneries d'Indo-chine merits special mention on account of the practical way in which it has adapted itself to local conditions, for it soon saw the necessity of a laboratory which it quickly set up and it is now continually benefitting by the results of the scientifically conducted investigations of the same.

The electric central station at Hanoi has been built by the Société Indo-chinoise d'Electricité (with a capital of 2,500,000 francs) and supplies Hanoi and Haiphong with D. C. for lighting and power, 2,500 h.p. at Hanoi and 1,200 h.p. at Haiphong. At Hanoi part of this current is transformed into A. C. for the wireless post of Bac-Mai close by.

Among other industrial enterprises the porcelain and fine pottery works of Hop-Loi may be mentioned. It is exclusively Annamite but fitted up on European lines and in spite of many primitive methods of manufacture it is continually improving the quantity and quality of its products, which are beginning to compete seriously with the ordinary porcelain imported from China and Japan.

We would also call attention to sundry brick-yards, one of which was started by an Annamite, to a brewery and to factories of buttons, cheddite and paint.

C.—NAM-DINH.

Messrs. Emery et Tortel, now transformed into the Société Franco-Annamite Textile et d'Exportation, possesses here an important silk-throwing and weaving mill fitted with modern machinery.

The Société Cotonnière du Tonkin, with a capital of over 3 million francs, also have a very complete mill here, turning out

cotton of every kind from thread for the native weavers up to cotton goods for Europeans and including a whole intermediate series of goods for the Annamites and Chinese.

A distillery of the Société Française des Distilleries de l'Indo-chine, as well as a few other works, including brick and tile works, are also to be found at Nam-Dinh.

D.—DAP-CAU

The principal works here are those of the Société des Papiers de l'Indo-chine. This company, with a capital of 2½ million of francs, owns a paper pulp factory at Vietri on the banks of the Red river which utilizes almost exclusively bamboo for this purpose, this cane being floated down from the highlands of Tonkin where it grows in profusion. With a motive power of 350 h.p. these works consume monthly 1,200 tons of bamboo out of which 280 tons of paper pulp are made.

The paper-mill at Dap-Cau disposing of 500 h.p., turns out each month 190 tons of paper of over ten various kinds, from that used by the newspapers of Tonkin up to the best letter-paper. A monograph on the use of bamboo, rice straw, etc., for making paper-pulp has been issued by the Agence Economique de l'Indo-chine at Paris, and is full of interesting information.

E.—LA-PHO

Before closing this rapid survey of French efforts in Tonkin attention should be called to a very good example of the high degree of adaptability and skill evinced by the Annamite workers when they are well taught and well treated, as shown by a new and special little industry requiring much intelligent observation on the part of the workers. This industry is that of the refining of lac carried on at La-Pho on the Black river, by Annamite men and women, who formerly after the gathering of the lac returned to their usual work. Their Hindu teachers, brought over at no

little expense, and who for generations have practised this craft, were astonished to see how quickly their pupils learnt the trade which in India was supposed to require a long apprenticeship and much specialization.

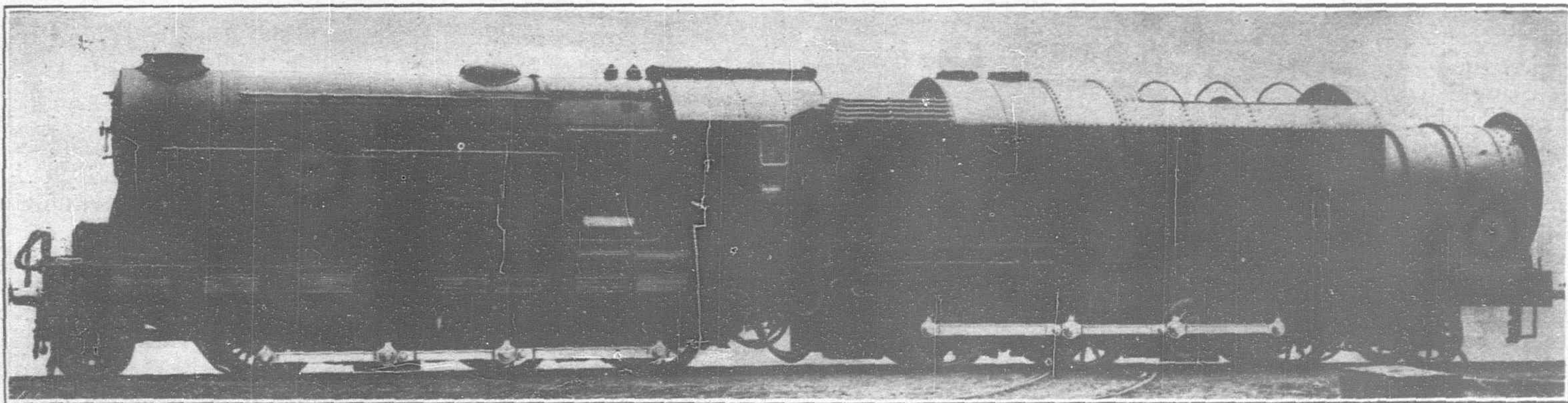
* * *

In conclusion a few words may be said about the innumerable small native handicrafts. Naturally clever the Annamite can make everything he requires in his own little workshop at home such as: lace, fine basket-work, mats and different articles in rushes, in rattan and in wood, turned or bent or lacquered, etc. Very interesting results may be obtained in this direction in either improving existing articles or starting new lines by European supervision, provided endless patience be shown and that skilled European workers be brought out to teach certain improved methods or manufacture and to correct the general want of finish which characterizes these native goods. The lace factories already started in Tonkin are a successful example of such co-ordination between East and West.

Among the small native industries weaving, and notably the weaving of silk, found all over the union, but more especially in Annam, Tonkin and Cambodia, forms the livelihood of numberless families and is increasing, the demand for such home-made fabrics being clearly greater than the supply.

In the big towns makers of boots, traveling trunks in wood or leather, furniture, etc., turn out their wares cheaply.

Finally, there remains a native industry which in spite of its primitive appliances turns out a product of high quality, that is the making of native paper from the bark of the cayjio (*Rhamnoneuron Balansæ*) the cultivation of which could be easily increased in the central districts. By the taking of a few precautions most beautiful paper, eminently suitable for artistic printing, could be obtained.



The Ramsay Condensing Locomotive Built by Sir W. G. Armstrong Whitworth & Co., Ltd.

A New Type of Locomotive

We give an illustration on this page of a locomotive of more than usual interest:—This type of engine was built by Sir W. G. Armstrong Whitworth & Co., Ltd., England, to the order of The Ramsay Condensing Locomotive Co., Ltd.

The following claims are made for this new type:—

A saving of 40 per cent. in coal consumption, over other types.

A still greater saving in water consumption.

An increase in power over corresponding modern locos.

Converting from high speed passenger to high speed goods loco. by a simple device.

As will be seen from the illustration, this locomotive is, in effect two separate units, which, coupled together, resemble to some extent the usual locomotive with its tender.

The front unit, with its boiler and frame, differs little from accepted practice, excepting that the cylinders and reciprocating parts are replaced by a turbo-generator of the impulse pressure compounded multi-stage type, connected with a three-phase generator. This generator supplies power to four three-phase motors arranged in two groups on the front and rear units of the locomotive. The power from these is transmitted through counter shafts to the six driving wheels on each unit, by the usual coupling rods. Each of these motors develops 275 h.p.

The rear unit incorporates a coal bunker and cooling water tank as well as a condenser and its appurtenances. This condenser is of the evaporating type, served with air from a fan at the rear of the engine.

In effect the Ramsay condensing locomotive is a self-contained power station on wheels—steam is passed through a turbine in which it does the work, and then into the condenser where it is reduced to water. This water is pumped into the boiler again for re-conversion into steam and so completes the cycle.

The great power of this condensing loco. appeals to railway engineers, owing to its much greater hauling capacity.

Increased power from the usual type of engine can only be got by increasing the dimensions, a course which is often rendered impracticable by limits imposed by tunnels, bridges, etc.

Hence two engines are often put to pull extra heavy loads. The Ramsay Co. claim that this new type will do twice the work of an ordinary engine and at a much lower cost.

The experimental model gave excellent results when tested on an English railway, a speed of 60 miles per hour being maintained over short runs with heavy loads.

Other new features in locomotive work adopted by the Armstrong Co. (who only organized for locomotive manufacturing after the armistice), is that they now electrically weld boiler tubes to the tube plates, thereby avoiding possibility of leakage.

Minerals of Chinese Turkestan

IN recent report, H.M. consul-general of Kashgar, Mr. C. P. Skrine, gives some account of the mineral resources of this province. Southern Hsinking is exceptionally rich in valuable minerals and oil, none of which are exploited on modern lines and some not exploited at all. The following are worked in the order of their importance; Jade, gold, copper, oil, and coal. Other deposits which are known to exist, but which are not, so far as is known, worked at the present date, are: Silver, lead, iron, antimony, sulphur, and mica.

JADE.—Jade is found in the micaceous and hornblende schists of the Kuen Lun Mountains, whence it is carried down in lumps and pebbles of varying size by the Karakash, Yurungkash, and Keriya rivers. The people of Khotan, Keriya, and neighboring villages recover the stone in considerable quantities from the river beds; formerly it was mined *in situ* at an almost inaccessible spot in the gorge of the Karakash south of Khotan, but the mine has not been worked for many years, and its very existence is now forgotten locally. There is no longer the free market for the product of the river beds that there used to be; most of it is taken up, at prices fixed by themselves, by the Chinese officials, and lumps of first-quality translucent green stone seldom or never come into the open market. The white and dull-green jades cost little in the uncarved state, the value being in the carving, which is done by artists at Peking. This work is not, and has never been, done at Khotan itself, where the stone is only worked into simple articles, such as beads, bangles, cups, etc.

GOLD.—"Placer" gold workings of considerable importance exist at several places, notably at Surghak, on the Niya river, 45 miles east-south-east of Keriya, and at Kapa, 25 miles south of Keriya. There are also workings at Chugullak and Chapchand, in the same neighborhood—the high snowy range, part of the Kuen Lun system, at the foot of which these mines are situated, being known as the Altyn Tagh, or "Golden Mountains." The mines are exploited in a primitive manner by the Chinese officials through local contractors, who slave-drive the miners to

such an extent that being sent to work in the gold mines is a common form of punishment for criminals in the Khotan and Keriya districts. The Chinese frequently have trouble with the contractor, and the output varies accordingly; in a good year as much as 900-lb. of gold is produced by an average of 2,000 miners. Nuggets of a lb. or more are frequently found. Gold "placers" are also worked at an extremely lonely and desert place called Ak-tagh, in the Karakoram, eight days' march south of Yarkand. This place is so inaccessible that it can only be worked for two months

in the early summer, after the snow has melted and before the summer floods have reached their height, and then the miners have to bring all their food and firewood with them. Owing to the lack of pumping plant, the output of these workings, which are continually being flooded, is small, but the gold-sand is very rich, and, if worked properly, would yield large profits. There are also undoubtedly gold deposits in other parts of the mountains to the south of Yarkand, but the people keep them secret in order to prevent the Chinese starting mines and forcing the local people to work in them.

COPPER.—Extremely rich deposits of red, black, and green copper ores, from which pure metallic copper is produced by one smelting only, exist on the Terek river, in the foothills of the T'ien Shan to the north of Kashgar, and at Kanjigan, west-north-west of Kashgar. The "mines" are mere scratchings, as the Chinese who exploit them do not know how to carry their shafts to any depth, but even so about 40,000-lb. of the metal are produced annually, and made into all kinds of utensils for the local market. Copper is also worked at Onbash, on the Muzart river, 70 miles north-east of

Aksu, while the ore is found near Kokya, on the Yarkand-Ladakh road, and in the Alai Mountains, to the west of Kashgar. No one in Kashgaria has any idea of how to refine copper chemically.

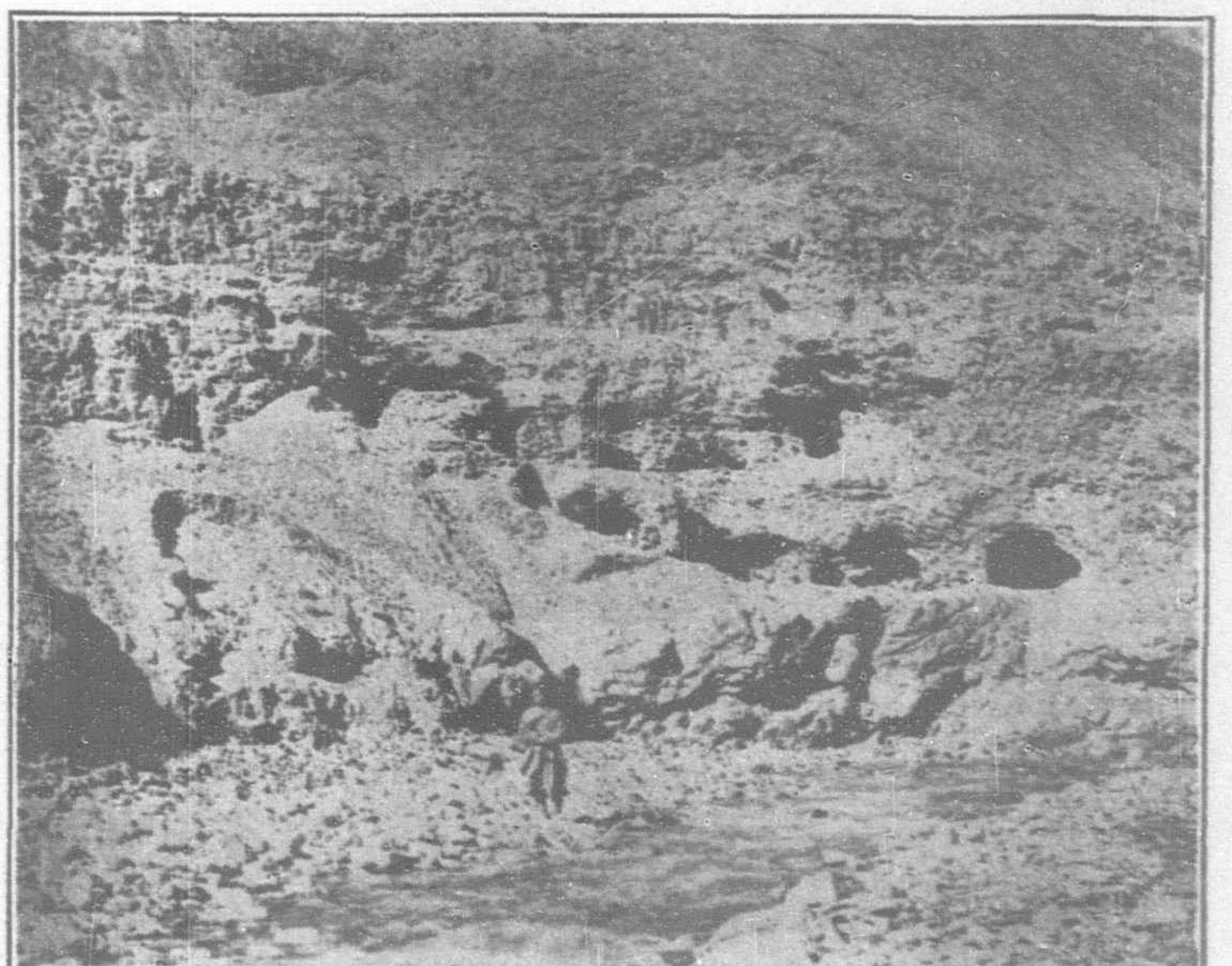
OIL.—The "Ferghana series" of oil-bearing strata extends into Kashgaria through Kanjigan, along the foot of the T'ien Shan, past Aksu, and right up to Kuchar. The chief wells worked by the Chinese are at Kanjigan, Aksu, and Kuchar; boring and chemical



Winnowing Gold in a Turkestan Mine.



Working Gold Mines at Sorghack



Gold Pits in Zailik Gorge

refining are alike unknown, the crude oil being scooped out of surface wells and holes. Even so, the strata are so rich that gasoline, kerosene, machine oil, grease, and mineral wax (ozokerit) of tolerable quality are all produced by means of primitive plant, and used freely in the chief towns. Here again the exploitation and manufacture, such as they are, are kept carefully in their own hands by the Chinese. The chief refineries are those worked at Kashgar by the Titai (general officer commanding, Kashgaria), and at Aksu by the magistrate.

COAL of fair quality, rich in coke, is found at Kanjigan, where shallow and primitive mines are worked by the Chinese. As only outcrops and weathered layers are mined, the coal is full of ash, and is unsatisfactory for domestic use; but it would make an admirable fuel for metallurgical purposes. Coal exists at many other places in the province, but the only other mines worth mentioning in the southern part are near Aksu, and in the Karatash valley, south of Yangi Hissar.

Besides the above minerals, the following are worked by the local Turkis, and are always to be found in the bazaars: Ozokerit (found in natural state near Kuchar and south of Yarkand; used extensively for candles), alum, salammoniac, gypsum. Good-quality fireclay is found in the carboniferous strata, and is extensively used by the natives in their smelting operations; it will be invaluable it and when the mineral resources of this country are ever properly worked. At present the one idea of the local Chinese authorities seems to be to keep foreign enterprise out, and exploit the minerals of the province for their own sole benefit.

Electrical Development in Manchuria

(Continued from page 82).

and pumps, Cochrane feed water heaters and the other specialties sold by this concern.

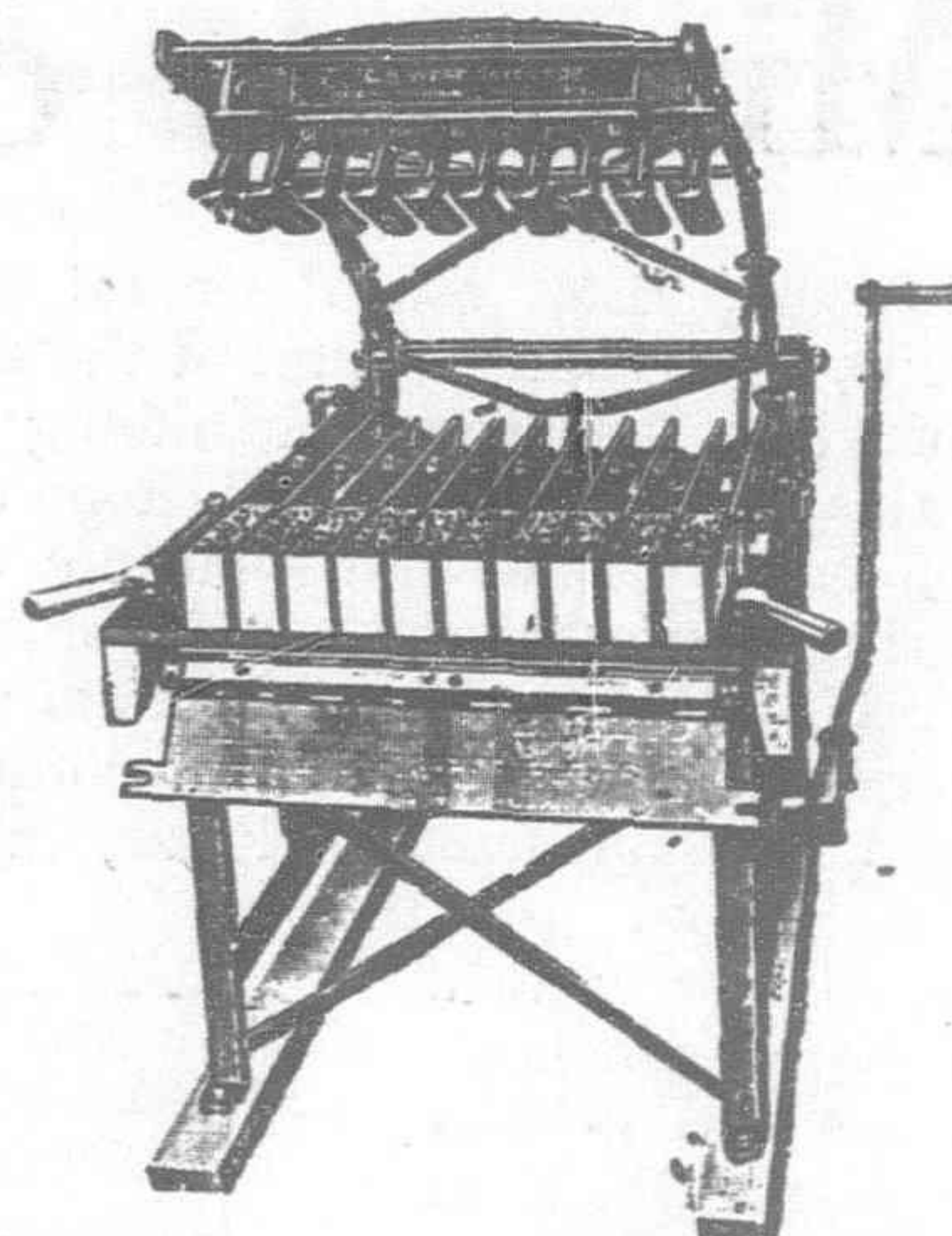
KIRIN.—Aside from the plants in Harbin and the capital city of the province, there are several small plants scattered throughout the province of Kirin. At Yenki, a Chinese company with a capital of \$100,000 operates a 60 k.w. plant: at Suiyuan there is another company capitalised at \$200,000 operating a 100 k.w. plant: at Suifenho is a plant with a capacity of 14,000 lamps of which 2,667 are in use: at Pien Nien-tze west of Harbin, is another plant operated by a company with \$100,000 capital having a lamp capacity of 2,000 and equipped with Japanese machinery made in Osaka: at Shwangchen-tze is another plant with a lamp capacity of 14,000 and at Imienpo one with a capacity of 3,000 lamps owned by Russians. A company to operate a plant to be erected in Siaoshihtzekai in Kirin province has been promoted with a capital of \$50,000.

HEILUNGKIANG.—In Heilungkiang province there is a 144 k.w. plant at the provincial capital of Tsitsihar owned by a Chinese company capitalised at \$100,000 supplying over 11,000 lamps; at Taheiho, near Aigun on the Amur river, is a plant operated by a company with \$300,000 capital supplying current for 3,000 lamps for public lighting and power for saw-mills. At Pehtwanlintze is found another 3,000 lamp plant and at Hulan one supplying 700 lamps and run by a gas engine and producer.

Americans Obtain Amur Gold Rights

Prospecting rights in approximately 3,500 square miles of placer gold fields in the Amur basin have been conceded to the Far East Exploration Company headed by Henry T. Hunt of Cincinnati says, a Moscow dispatch. The concession was obtained by Charles H. Smith, former American member of the Chinese Eastern Railway commission.

The company expects to begin work in the spring, but its rights are available until January 1, 1925, after which date it must make a final contract, meanwhile paying from 5 to 8 per cent. royalties in addition to an acreage charge. The fields were last worked in 1915.



CONCRETE BUILDING BRICK

The above machine manufactures ORNAMENTAL FACE BRICK in many designs and colors. Makes ten bricks in single operation.

The machine, process of applying facing to brick and composition of facing, is patented.

Inquiries are solicited from reliable and well-financed business men for complete patent rights in their country.

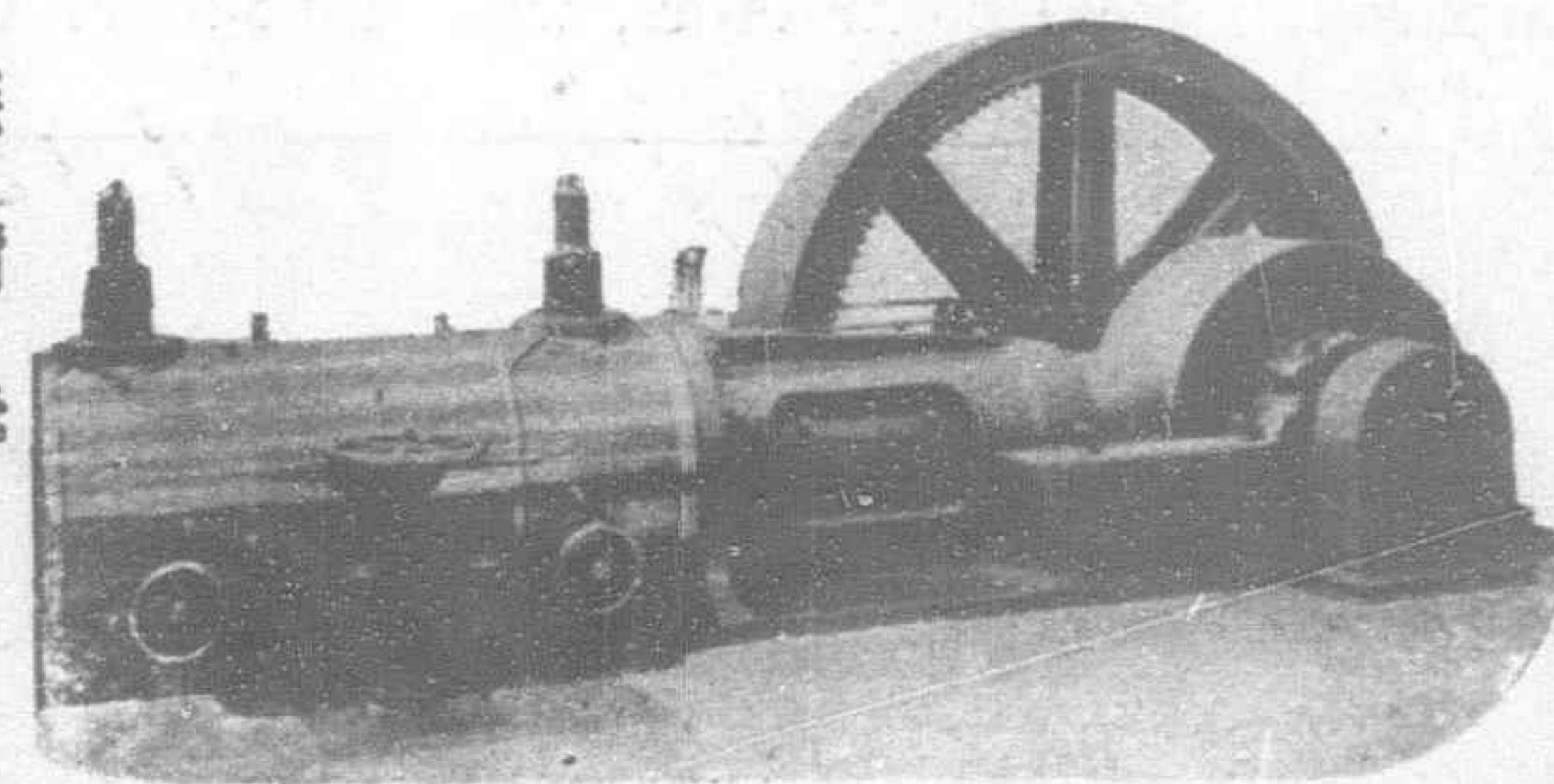
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Sulzer Uniflow Steam Engines for Mill Driving producing from 100 to 3,000 H.P. in one Cylinder guaranteed coal consumption for complete plant (with Sulzer Upright Watertube Boiler) from 1.5 to 1.2 lbs. per I.H.P. per hour, with coal of about 12,000 B.T.U. per lb.

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